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, 2021

OR

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

For the transition period from to

1-35573

(Commission file number)

TRONOX HOLDINGS PLC

(Exact name of registrant as specified in its charter)

England and Wales	98-1467236
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
263 Tresser Boulevard, Suite 1100 Stamford, Connecticut 06901	Laporte Road, Stallingborough Grimsby, North East Lincolnshire, DN40 2PR United Kingdom

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

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

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

Trading Symbol: TROX

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

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

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

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

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

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

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
Emerging growth company	☐		

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

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

The aggregate market value of the ordinary shares held by non-affiliates of the registrant as of June 30, 2021 was approximately $2,598,591,296.

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

As of January 31, 2022, the registrant had 153,937,928 ordinary shares outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's proxy statement for its 2022 annual general meeting of shareholders are incorporated by reference in this Form 10-K in response to Part III Items 10, 11, 12, 13 and 14.

TRONOX HOLDINGS PLC
ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2021
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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,” “estimates,” “expects,” “intends,” “plans,” “predicts,” “will,” “would,” “could,” “can,” “may,” and similar terms. These forward-looking statements, which are subject to known and unknown risks, uncertainties and assumptions about us, may include projections of our future financial performance based on our growth strategies and anticipated trends in our business. These statements are only predictions based on our current expectations and projections about future events. There are important factors that could cause our actual results, level of activity, performance or achievements to differ materially from the results, level of activity, performance or achievements expressed or implied by the forward-looking statements. In particular, you should consider the numerous risks and uncertainties outlined in “Risk Factors.”

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

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

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

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

- the risk that our customers might reduce demand for our products;
- market conditions and price volatility for titanium dioxide (“TiO_2”), zircon and other feedstock products, as well as global and regional economic downturns, that adversely affect the demand for our end-use products;
- the potential negative impacts of COVID-19 on our business as well as the global economy and financial markets;
- the possibility that Chinese production of chloride technology and improvements in product quality may occur more quickly than anticipated;
- changes in prices or supply of energy or other raw materials;
- liability, production delays and additional expenses from environmental and industrial accidents;
- production curtailments, shutdowns or additional expenditures resulting from equipment upgrades, equipment failures and deterioration of assets;
- the possibility that cybersecurity incidents or other security breaches may seriously impact our results of operations and financial condition;
- risks of operating a global business;
- political and social instability, and unrest, in the regions in which we operate, including South Africa and the Middle East region;
- economic conditions and regulatory changes following the U.K.'s exit from the E.U. could adversely impact our operations, operating results and financial condition;
- fluctuations in currency exchange rates;
- the risk 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;

- 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 and Energy to the Mining Charter (as defined elsewhere herein);
- the risk that our TiO_2 products are subject to increased regulatory scrutiny, that may impede or inhibit widespread usage of TiO_2 and/or diminish the Company's ability to sustain or grow its business or may add significant costs of doing business;
- ESG issues, including those related to climate change and sustainability, may subject us to additional costs and restrictions;
- the risk that our ability to use our tax attributes to offset future income may be limited;
- concentrated share ownership in the hands of Cristal may result in conflicts of interest and/or prevent minority shareholders from influencing the Company;
- the risk that we are dependent on, and compete with other mining and chemical businesses for, key human resources in the countries in which we operate; and
- impact of English law and our articles of association on our ability to manage our capital structure flexibly and the anti-takeover protections incorporated into our articles of association.

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.

PART I

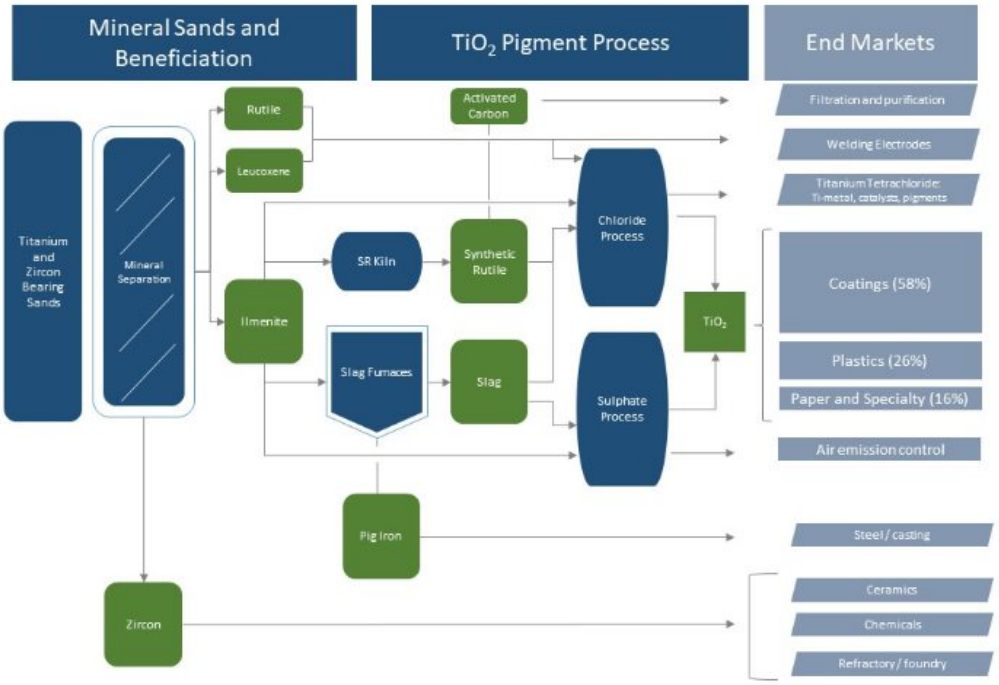
For the purposes of this discussion, references to "we," "us," and, "our" refer to Tronox Holdings plc, together with its consolidated subsidiaries (collectively referred to as "Tronox" or the "Company"). We are a public limited company formed under the laws of England and Wales. We are considered a domestic company in the United Kingdom and, as such, are required to comply with filing requirements in the United Kingdom. Additionally, we are not considered a "foreign private issuer" in the U.S.; therefore, we are required to comply with the reporting and other requirements imposed by the U.S. securities law on U.S. domestic issuers, which, among other things, requires reporting under accounting principles generally accepted in the United States of America ("U.S. GAAP").

Item 1. Business

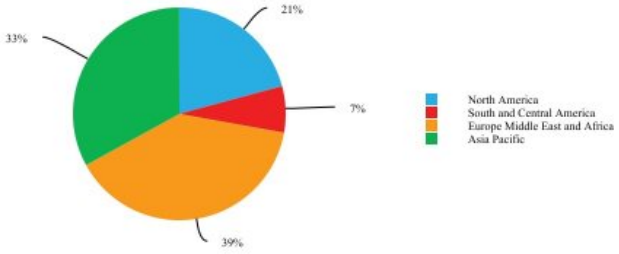
Overview

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

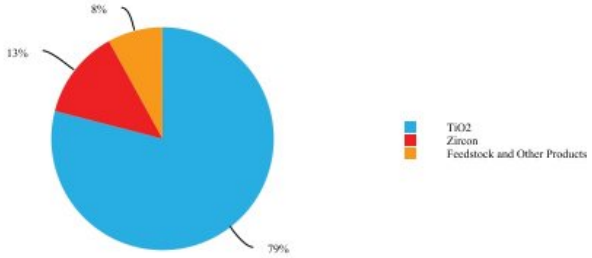
The following chart highlights the TiO_2 value chain we participate in (percentages set forth in the chart below refer to the global TiO_2 market as of December 31, 2021):



The following sets forth the percentage of our revenue derived from sales of our products by geographic region for the year ended December 31, 2021.



The below sets forth the percentage of our revenue derived from sales of our products for the year ended December 31, 2021.



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

2021 Key Strategic Initiatives

The following sets forth the key strategic initiatives undertaken during 2021:

Become the Low Cost TiO_2 Producer by Investing in our Business Processes and Strengthening Vertical Integration

Our ability to compete effectively in the TiO_2 industry is determined by many factors, including innovation, reliability, product quality, customer service and price. The business processes that allows us to maximize the benefit of our vertical integration and global footprint --- the so-called "hidden factory" --- needs to be optimized if we are to successfully meet the pricing and other competitive pressures that characterize our industry. One of the largest investment projects that we continued to pursue in 2021 to improve our global business processes is what we call "Project newTRON," a multi-year IT-enabled transformation program that includes both operational and business transformation. We believe that Project newTRON will not only enable us to maintain our position as among the lowest cost producers of TiO_2 but also substantially improve the reliability, customer service, cybersecurity and the IT resiliency of our operations.

In terms of strengthening vertical integration, we have two significant mining projects currently underway. Most significant is the development of a mine in Eastern Australia called Atlas Campaspe. Atlas Campaspe is intended to replace feedstock supply from our existing Snapper / Ginkgo mines in Eastern Australia which are expected to be mined until at least 2023. Our pre-mining feasibility work indicates that this mine is abundant in natural rutile and high-value zircon, and will be a significant source of high grade ilmenite suitable for direct use, synthetic rutile production, or slag processing. In addition, we are investing in expanding our Fairbreeze and Namakwa mines in South Africa. Like Atlas Campaspe, we believe these expansions are extremely attractive mine development projects, rich in ilmenite, rutile and zircon that are expected to replace existing mines which would otherwise deplete in 2024 and 2025. We have numerous other mine development projects in earlier stages of development in Western Australia and on the Eastern and Western Capes of South Africa, all of which are intended to maintain or expand our level of feedstock vertical integration.

Our vertical integration strategy may also benefit from the 2022 start-up of a titanium slag smelter facility (the "Slagger") located in The Jazan City for Primary and Downstream Industries in KSA. On May 9, 2018, we entered into an Option Agreement with Advanced Metals Industries Cluster Company Limited ("AMIC") which is owned equally by Tasnee and Cristal. Under the terms of the Option Agreement, AMIC granted us an option (the "Option") to acquire 90% of a special purpose vehicle (the "SPV") which will hold AMIC's ownership in the Slagger. The Option may be exercised if the Slagger achieves certain production criteria related to sustained quality and tonnage of slag produced (the "Option Criteria"). Likewise, AMIC may require us to acquire the Slagger on the same terms if the Option Criteria are satisfied (the "Put"). If the Option Criteria are met and Cristal exercises the Put or we exercise the Option, AMIC will also contribute $322 million of AMIC indebtedness (the "AMIC Debt") to the SPV before we acquire a 90% ownership in it. In addition, pursuant to the Option Agreement, we agreed to lend AMIC up to $125 million for capital expenditures and operational expenses intended to facilitate the start-up of the Slagger (the "Tronox Loans"). As of December 31, 2021, we have loaned AMIC $125 million to facilitate the startup of the Slagger. If the Option Criteria are met and Cristal exercises the Put or we exercise the Option, AMIC will also contribute the Tronox Loans to the SPV before we acquire a 90% ownership in it.

On May 13, 2020, we amended the Option Agreement (the "First Amendment") with AMIC to address circumstances in which the Option Criteria fail to be satisfied. Pursuant to the First Amendment, if the Option Criteria are not satisfied, Tronox has the right to acquire 90% of the SPV in exchange for the forgiveness of the Tronox Loans in which case the AMIC Debt will be retained by AMIC and not contributed to the SPV.

Additionally, on May 13, 2020, we amended a Technical Services Agreement (the "Amended TSA") that we had entered with AMIC on March 15, 2018 to supplement certain technical services that we had originally agreed to provide. Under the Amended TSA, we agreed to provide technical advice and project management services including supervision and management of third-party consultants intended to increase the likelihood that the Option Criteria are satisfied. AMIC and its consultants remain responsible for engineering and construction of the Slagger. As compensation for these services, Tronox receives a monthly management fee of approximately $1 million, subject to certain success incentives if and when the Slagger achieves the Option Criteria. The term of the Amended TSA was extended in December 2021 until December 31, 2022.

Capital Allocation and Global Debt Refinancing

During 2021, we repaid approximately $745 million in debt and are on course to achieve our previously announced $2.5 billion gross debt objective well ahead of our 2023 target. Our anticipated strong free cashflow not only enabled us to accelerate our debt reduction program, but also enabled us to announce in November 2021, the authorization by our Board of Directors of up to $300 million of repurchases of our ordinary shares. At the same time, we also announced the Board's intention to increase the annual dividend to $0.50 per share.

Further, in March 2021, we consummated a debt refinancing transaction which lowered our annualized cash interest by approximately $30 million and extended our debt portfolio's weighted average years to maturity by approximately 3 years. The refinancing consisted of: (a) $1.3 billion first lien loan agreement due in 2028; (b) $350 million cash flow revolving credit facility; and (c) $1.075 billion 4.625% senior unsecured notes due 2029, the proceeds of which were used to redeem approximately $1.065 billion of our then outstanding senior notes.

Exxaro Exit Transaction

In the first quarter of 2021, Exxaro Resources Limited ("Exxaro") sold its entire share ownership in Tronox, totaling 21,975,315 ordinary shares, in an underwritten secondary offering. As part of its exit transaction and as contemplated under the 2012 merger agreements between Exxaro and Tronox, Exxaro exchanged its 26% shareholding in our South African operating subsidiaries for 7,246,035 ordinary shares which were also sold by Exxaro as part of the underwritten offering. As a result, we now own 100% of our South African operating subsidiaries.

Our Principal Products

TiO_2

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.

Ultrafine Specialty TiO_2

We use the sulfate process at our manufacturing facility in Thann, France to produce ultrafine TiO_2 products. We market ultrafine TiO_2 products under the CristalActiv® trademark. Ultrafine TiO_2 has highly catalytic properties due to the relatively high surface area of each TiO_2 molecule. The principal use of ultrafine TiO_2 products is in NOx emission control products utilized in stationary, mobile and marine applications.

In 2021, we generated $2.8 billion in revenue from sales of TiO_2.

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 adds 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 we mine, but has a relatively high value compared to other heavy mineral products. Refractories containing zircon are expensive and are only used in demanding, high-wear and corrosive applications in the glass, steel and cement industries. Foundry applications use zircon when casting articles of high quality and value where accurate sizing is crucial, such as aerospace, automotive, medical, and other high-end applications.

In 2021, we generated $478 million in revenue from sales of zircon.

Feedstock and Other Products

High Purity Pig Iron

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

Feedstock

Most TiO_2 products are derived from three naturally occurring minerals which are commonly referred to as heavy minerals or mineral sands: ilmenite, leucoxene and rutile. Ilmenite, rutile, leucoxene, as well as titanium slag and synthetic rutile which are processed from ilmenite, are the primary feedstock materials that we use for the production of TiO_2 pigment. Titanium slag is produced by smelting ilmenite in an electric arc furnace to separate titanium-oxide from the iron and other impurities. Synthetic rutile is produced by reducing ilmenite in a rotary kiln, followed by leaching under various conditions to remove the metallic iron from the reduced ilmenite grains. The purpose of both processes is to increase the titanium concentration of the ilmenite. There is substantial overlap amongst each of the aforementioned with the primary differentiating factor being the level of titanium content.

For instance, rutile has the highest titanium dioxide content of approximately 94% to 96%, while ilmenite has the lowest of approximately 45% to 65%. As a result of expiration of external feedstock agreements entered into in connection with the regulatory approval of our Cristal transaction and our continued pursuit of our vertical integration strategy, we do not expect to actively sell feedstock going forward.

Titanium Tetrachloride

We sell titanium tetrachloride ("$TiCl_4$") from our facilities in Thann, France and Yanbu, KSA. At our Thann facility in France, we produce $TiCl_4$ dedicated for sale to customers for use mainly in the production of various types of pigments and catalyst products. At our Yanbu facility, we produce excess $TiCl_4$ which we sell directly to a joint venture between Advanced Metal Industries Cluster and Toho Titanium Metal Co. Ltd. ("ATTM") for use at a titanium sponge plant facility that is adjacent to our Yanbu facility.

In 2021, we generated $301 million in revenue from the sale of high purity pig iron, feedstock, titanium tetrachloride and other products. This amount also includes revenue generated from the 8120 paper laminate grade to Venator Materials plc ("Venator"). In 2019, as part of the Cristal transaction and in order to obtain approval by regulators in the European Union, we sold the 8120 paper laminate grade to Venator and entered into a three-year transitional supply agreement which will terminate in April 2022. Revenue from 8120 paper laminate grade sales to Venator are included within Feedstock and Other products until the expiration date of the supply agreement with Venator.

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

Mining and Beneficiation of Mineral Sands Deposits

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

- KwaZulu-Natal ("KZN") Sands operations located on the eastern coast of South Africa consisting of the Fairbreeze mine, a concentration plant, a mineral separation plant and two smelting furnaces that produce titanium slag;
- Our Namakwa Sands operations located on the western coast of South Africa consisting of the Namakwa mine, two concentration plants, a mineral separation plant, as well as two smelting furnaces that produce titanium slag;
- Our Northern Operations complex in Western Australia consisting of the Cooljarloo dredge mine and floating heavy mineral concentration plant and the Chandala metallurgical site which includes a mineral separation plant and a synthetic rutile plant that produces synthetic rutile;
- Our Eastern Australia operations consisting of the Ginkgo and Snapper mines, a floating heavy mineral concentration plant at the Ginkgo site, and a mineral separation plant;
- Our Perth Basin operations in Western Australia consisting of the Wonnerup mine and a mineral separation plant; and
- Our Paraiba, Brazil mining operations ceased during 2020 in line with our life of mine plan; however, we believe there is enough feedstock to supply the Brazil pigment plant through 2023.

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

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

Regardless of the type of mining technique, the first step in the beneficiation process after the mineral sands have been mined 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 rutile and leuxocene 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 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 TiO_2 feedstock material, and 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. Activated carbon is a byproduct of this process. Our synthetic rutile has a titanium dioxide content of approximately 89% to 92% and is also considered a TiO_2 feedstock material.

Our current mining and beneficiation operations have an annual production capacity of approximately 832,000 metric tons ("MT") of titanium feedstock, which is comprised of 182,000 MT of rutile and leucoxene, 240,000 MT of synthetic rutile and 410,000 MT of titanium slag. We currently have the capability to produce approximately 297,000 MT of zircon and 250,000 MT of pig iron.

Competitive Conditions of Mining and Feedstock Production

Globally, there are a large number of mining companies that mine mineral sand deposits containing ilmenite, as well as zircon. However, there is a smaller number of mining companies that are also involved in upgrading the underlying ilmenite to produce feedstock typically utilized by TiO_2 producers.

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

Production of 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 (collectively known as finishing). Currently, approximately 87% of our TiO_2 pigment production capacity is produced using the chloride process and approximately 13% of our TiO_2 production capacity is produced using the sulfate process.

In the chloride process, feedstock (slag, synthetic rutile, natural rutile or ilmenite ores) are reacted with chlorine (the chlorination step) and carbon to form $TiCl_4$ in a continuous fluid bed reactor. Purification of $TiCl_4$ to remove impurities is accomplished using selective condensation and distillation processes. The purified $TiCl_4$ 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. Due to the nature of the production process, the final pigment product is not sensitive to the feedstocks used to create it, as substantially all substances other than TiO_2 are removed during the process. The chloride process currently accounts for substantially all of the industry-wide TiO_2 production capacity in North America, and approximately 43% of industry-wide capacity globally.

In the sulfate process, ilmenite and/or slag are dissolved in concentrated sulfuric acid. After removing impurities, dissolved titanium is hydrolyzed and separated from the remaining sulfuric acid. The titanium hydrolysate is subsequently calcined in a rotary kiln to produce a raw TiO_2. The product is then further finished in a similar way to TiO_2 produced through the chloride process.

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.

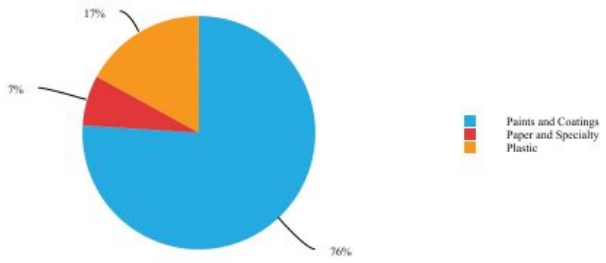
The primary raw materials used in the production of chloride TiO_2 pigment include titanium feedstock, chlorine and coke. As discussed above, we believe we are unique in the degree to which we produce our own high-grade titanium feedstock. Other chemicals used in the production of TiO_2 are purchased 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 of TiO_2

We supply and market TiO_2 under the brand name TIONA® and CristalActiv® to approximately 1,200 customers in approximately 120 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. In 2018, we launched a margin stabilization program which provides relative certainty over availability of product and price stability to customers who choose to participate. In early 2021, we initiated a long-term partnership strategy that we believe will strengthen the commitments from our customers across all regions and products. The long-term partnership strategy and margin stabilization programs are key parts of our TiO_2 marketing and sales strategy, enabling us to focus on predictability and reliability of TiO_2 delivery across the supply and demand cycle.

The following sets forth the percentage of our TiO_2 sales volume by end-use market for the year ended December 31, 2021:



In addition to price and product quality, we compete on the basis of technical support and customer service. We sell our products through both a direct sales force and third-party agents and distributors. Our direct sales, marketing and technical service organizations execute our sales and marketing strategy on a global basis. 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 aligning ourselves with customers growing faster than the market and effective customer management through the development and maintenance of strong relationships. We develop customer relationships and manage customer contact across multiple contact points within the organization including our sales, technical service and marketing, research and development, and customer service teams. These primary points of contact are supplemented by direct contact with plant operations personnel, supply chain specialists, and senior management. We believe that multiple points of customer contact facilitate efficient problem solving, supply chain support, formula optimization and co-development of products.

Competitive Conditions of TiO_2 Pigment

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 from both chloride process pigment producers and sulfate process pigment producers. Moreover, because transportation costs are minor relative to the cost of our product, there is also competition between products produced in one region versus products produced in another region.

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

Research and Development

We have research and development facilities that aim to develop new products, service our products, and focus on applied research and development of both new and existing processes. We utilize a third party for research and development support with respect to our mineral sands business located in South Africa and Australia. The majority of scientists supporting our TiO_2 pigment product development and testing are located in Oklahoma City, Oklahoma, USA and Stallingborough, UK, while the majority of scientists supporting our TiO_2 ultrafine specialty business are located in Thann, France.

New process developments are focused on increased throughput, efficiency gains and general processing-related improvements for our customers. Ongoing development of process technology contributes to cost reduction, enhanced production flexibility, increased capacity, and improved consistency of product quality. In 2021, our product development and commercialization efforts successfully produced a new coatings product at our Bahia TiO_2 pigment plant as well as expanded the number of product grades produced at our Yanbu site. We also advanced product development for the plastics industry which is expected to result in increased growth in that segment commencing in 2022. In addition, our specialty chemicals and materials development efforts have been focused on producing products that we believe will benefit the environment.

Patents, Trademarks, Trade Secrets and Other Intellectual Property Rights

Protection of our proprietary intellectual property is important to our business. At December 31, 2021, we held 108 patents and 5 patent applications in the U.S., and approximately 656 in foreign counterparts, including both issued patents and pending patent applications. Our U.S. patents have expiration dates ranging through 2037. Additionally, we have 9 trademark registrations in the U.S. and 2 trademark applications in the U.S., as well as 272 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—If our intellectual property were compromised or copied by competitors, or if competitors were to develop similar intellectual property, our results of operations could be negatively affected. Further, third parties may claim that we infringe on their intellectual property rights which could result in costly litigation."

Human Capital

Tronox employs approximately 6,500 people across six continents, and we believe it is our rich diversity and exceptional operational and technical expertise that, combined with our vertical integration model, position Tronox as the world's leading vertically integrated manufacturer of titanium dioxide pigment. Recognizing the importance of our human capital, we have made People, Culture and Capabilities one of our five strategic pillars, and placed a priority around developing leaders who will help us effectively (i) acquire, develop and nurture our talent, and (ii) foster a culture that embodies the values that are important to us, starting with safety and operating our business responsibly.

People

Because we operate both titanium ore mines and titanium dioxide pigment plants, and because our operations span the world, we require specialty skills in mining and TiO_2 pigment manufacturing. We also need people who are willing to learn skills across both mining and chemicals operations and who can help us extract value from our integrated model. The below map sets forth the approximate number of employees as of December 31, 2021, in each of the global regions in which we operate.

Accordingly, we place a high priority on knowledge transfer (including by relocating skilled leaders across countries and between mining and TiO_2 pigment operations, by staffing high-potential employees in regions on global projects, and by enabling collaboration in global centers of excellence), and we place a high priority on fostering diversity, equity and inclusion. We are committed to creating an organization where leaders encourage a diverse workforce, where people feel valued and respected, have access to opportunities, and in which a variety of different voices are encouraged and heard. For instance, during 2021, we implemented a Diversity and Inclusion steering committee and developed a Diversity and Inclusion strategy consisting of three mission drivers: Workforce Reflective of our Communities, Foster an Inclusive Culture, and Develop our Diverse Talent. Moreover, in 2021, we launched a Women in Leadership Program consisting of female leaders across our company.

We also place an uncompromising focus on operating safe, reliable, and responsible facilities, and we measure our progress with both safety metrics and leading indicators. We believe every employee and contractor has a responsibility for safety, and we proactively identify and manage risk, conduct ourselves responsibly, exercise good judgement, and take accountability for our actions. In 2021, our employees worked more than 12 million hours with 22 recordable injuries and no fatalities from our operations, and our contractors worked more than 8 million hours with 20 recordable injuries and no fatalities from our operations. For the tenth year in a row our aggregate employee plus contractor total recordable injury rate was lower than the prior year.

As we continue to navigate the dynamic COVID-19 environment, we continue to take swift actions in response to the pandemic to protect our employees, Tronox carefully monitored the impacts to our operations. We were able to operate globally without material disruption. We put prudent and proportionate measures in place, such as restricted employee travel, remote working, staggered shifts, wellness checkpoints at our entrances, visitor restrictions and more robust sanitation, and disinfecting procedures.

Culture

We aim to create an organizational culture where employees unleash their full value through living our values, and fostering a high-performance culture. We apply an "outward mindset" by which we mean that each employee should be highly aware of the organization's goals and how his or her individual actions affect the entire organization.

Nearly all of our employees have been through training and development courses which instill the principles of working with an outward mindset. The consistent training and reinforcement of the importance of acting with an outward mindset has enabled us to transform our culture. We believe this cultural transformation is reflected in our results, starting with safety: our people truly care for one another, and not only other employees, but also our contractors, visitors and communities. Shaped by an outward mindset, our people have embraced our global diversity and are naturally inclusive.

Today, we are a collaborative group of people who naturally want to be helpful to others, and we adjust our own efforts to make our colleagues' work easier, however we can.

Building on the foundation of applying an outward mindset, we have adopted a set of core values that describes our expectations of one another, starting with safety. Every performance review starts with a self-assessment and manager's assessment of our consistency in living our values. Employees are encouraged – and provided a toolkit – to develop in the values where they are weak, and to help coach others in the values where they are strong.

Tronox Core Values

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

Capabilities

Developing the operating and technical skills of our people, and the leadership competencies of our leaders, is an essential component of our business strategy.

At the beginning of 2020 we assessed the competencies of our senior leaders on ten dimensions, and then identified a competency on which they would focus their development during the year. Leaders were encouraged to access targeted executive education courses that aligned with their development from a new online program we offered. During 2021, in addition to our senior leaders, our managers were also assessed on their leadership competencies and a competency was identified for development in 2022.

In addition to our focus on leadership development, we continued to leverage and enhance our employees learning through the following initiatives:

- Offered online education to all employees via a broad based global learning platform, providing leadership development, business skills and information technology; and
- Created development plans for prioritized technical areas based on gaps identified from a comprehensive skills assessment.

In addition, our employees are further guided by our code of conduct and business ethics and we conduct annual global training to help them fully understand and comply with our code of conduct.

We also have a rigorous succession planning process with respect to key positions throughout the organization. We believe such process allows us to proactively develop the talent of the future and allows us to move with speed and agility when leadership changes are required, as was demonstrated in the recent appointment of our co-CEOs and the election of our Chairman of the Board of Directors. As part of the succession planning process, high potential leaders are identified and development plans are completed for each candidate.

Sustainability

Our business requires an unwavering focus on sustainable operating practices, and our commitment to sustainability supports our overall vision and strategy to be the world's leading vertically integrated TiO_2 producer. As such, we integrate sustainability into every aspect of our business—from our culture and our strategy to our operating practices. We believe sustainable operations enable us to better control costs and manage our environmental footprint. In addition, we enhanced oversight of ESG by reorganizing the Board committee structure to make the Corporate Governance and Nominating Committee the Corporate Governance and Sustainability Committee with a restated committee charter that requires management to regularly report on key ESG initiatives. Sustainability also encompasses providing our employees with a safe, diverse workplace and offering them opportunities to grow and develop. Ultimately, safe, environmentally sustainable operations demonstrates our respect for our communities and supports our continued privilege to operate.

During 2021, we received a Platinum Rating by EcoVadis in recognition of our sustainability efforts. This Platinum Rating places us in the Top 1% of the 85,000 companies evaluated around the world by EcoVadis on their sustainability performance, and the Top 2% in the Basic Chemicals Manufacturing sector. The EcoVadis assessment focuses on four themes: the environment, labor and human rights, ethics, and sustainable procurement. In 2021, we achieved a 10-point increase in all categories, and a 20-point increase in the environmental category compared to our score in 2020.

EcoVadis is a leading third-party independent assessment organization that evaluates companies' sustainability performance. Their methodology is based on international sustainability standards including the Global Reporting Initiative (GRI), United Nations Global Compact (UNGC) and ISO 26000.

Environmental, Health and Safety Authorizations

Mining

Our facilities and operations are subject to extensive general and industry-specific environmental, health and safety regulations in jurisdictions where we operate, but particularly 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

Each Australian state and territory has its own legislation regulating the exploration for and mining of minerals. Our key exploration and mining operations are regulated by the Mining Act 1978 (WA), the Mining Act 1992 (NSW) and their related regulations.

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 the development of certain of our Western Australian operations is the agreement authorized by the Mineral Sands (Cooljarloo) Mining and Processing Agreement Act 1988 (WA). This agreement concluded in March 2020 and Tronox's rights and obligations are now covered by the Western Australian Mining Act.

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 require chemical substances which are newly imported or manufactured in the EU to be registered before being placed on the market, assessed for human health or environmental risk and for registrations to be updated periodically such as when new information

emerges relevant to human health or environmental risks associated with the production or use of the substance. In 2020, the European Commission adopted a regulation classifying certain forms of TiO_2 with a particular aerodynamic diameter as a Category 2 carcinogen by inhalation. This regulation came into effect in October 2021. For additional information on this topic, see section entitled "Risk Factors - Risks Relating to our Legal and Regulatory Environment - Our TiO_2 products are subject to increased regulatory scrutiny that may impede or inhibit widespread usage of TiO_2 and / or diminish the Company's ability to sustain or grow its business or may add significant costs of doing business."

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 jurisdictions requiring such managing and reporting of GHGs, primarily the European Union and Australia. For additional information on this topic, see section entitled "Risk Factors – Risks Relating to our Legal and Regulatory Environment - ESG issues, including those related to climate change and sustainability, may subject us to additional costs and restrictions, including increased energy and raw material costs, which could have an adverse effect on our business, financial condition and results of operations, as well as damage our reputation."

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 on Form 10-K 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. The content of the SEC's internet site is available for informational 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 on Form 10-K unless expressly noted.

Item 1A. Risk Factors

Item 1A. Risk Factors

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

RISKS RELATING TO OUR BUSINESS

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

Our revenue and results of operations are significantly dependent on sales of TiO_2 products and zircon. Demand for these products historically have been linked to global, regional and local GDP and discretionary spending, which can be negatively impacted by regional and world events or economic and market conditions. Such events can cause a decrease in demand for our products and market prices to fall, which may have an adverse effect on our results of operations and financial condition. A substantial portion of our products and raw materials are commodities that reprice as market supply and demand fundamentals change. Accordingly, product margins and the results of operations tend to vary with changes in the business cycle.

A significant portion of the demand for our TiO_2 products comes from manufacturers of paint and plastics. A significant portion of the demand for zircon comes from the construction and other industrial end markets. Our customers may experience significant fluctuations in demand for their own end products because of economic conditions, changes in consumer demand, or increases in raw material and energy costs. In addition, with respect to the zircon market, we believe that China currently accounts for approximately 50% of the world's demand for zircon. As such, any prolonged downturn in China could have a material adverse effect on our business and financial results.

The price of our products, in particular, TiO_2, zircon, and pig iron, 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, zircon and pig iron have been volatile, and those markets are likely to remain volatile in the future. Prices for TiO_2, zircon and pig iron may fluctuate in response to relatively minor changes in the supply of, and demand for, these products, market uncertainty and other factors beyond our control. Factors that affect the price of our products include, among other things:

- overall economic conditions;
- the level of customer demand particularly in the paint, plastics and construction industries;
- the level of production and exports of our products globally, including the impact of competitors increasing their capacity and exports;
- the level of production and cost of materials, such as chlorine, sulfuric acid and anthracite, used to produce our products, including rising prices of raw materials due to inflation;
- the cost of energy consumed in the production of TiO_2 and zircon, including the price of natural gas, electricity and pet coke;
- 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, zircon and feedstock/other products.

Pricing pressure with respect to our TiO_2 products, zircon and pig iron 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.

The ongoing global COVID-19 pandemic has adversely affected, and may continue to adversely affect, our business, financial condition and results of operations.

The ongoing global COVID-19 pandemic, including new strains of the virus, has adversely affected, and may continue to adversely affect, our business, financial condition and results of operations. We have significant sales and manufacturing operations in the U.S., Europe, South Africa, Brazil, the Kingdom of Saudi Arabia and Australia, and each of these countries has been significantly affected by the outbreak and taken measures to try to contain it. These restrictive measures have adversely impacted, and may further adversely impact, our workforce and operations, the operations of our customers, and those of our respective vendors and suppliers. Demand for our products could decrease as a result of the pandemic. Any such future developments are dependent upon factors including, but are not limited to, the duration and spread of the outbreak, the severity of new strains of the virus, the actions to contain the virus or treat its impact, the effectiveness of treatments and vaccines, the size and effectiveness of the compensating measures taken by governments, including the failure to implement additional stimuli and how quickly and to what extent normal economic and operating conditions can resume.

In addition, the COVID-19 pandemic has significantly increased economic and demand uncertainty. It is possible that the continued spread of COVID-19, including new strains of the virus, will cause an additional economic slowdown, and it is possible that this could cause a global recession. Such adverse impact on the global economy is likely to adversely affect our performance, financial condition and results of operations, as well as our ability to successfully execute our business strategies and initiatives, such as the funding of capital expenditures, including by negatively impacting the demand for our products and services, negatively affecting the parties with whom we do business and disrupting our ability to conduct product development and other important business activities.

To the extent the COVID-19 pandemic continues to adversely affect the global economy, and/or adversely affects our business, operations or financial performance, it may also have the effect of increasing the likelihood and/or magnitude of other risks described in this section entitled "Risk Factors". We are closely monitoring the potential adverse effects and impact on our operations, businesses and financial performance, including liquidity and capital usage, though the extent is difficult to fully predict at this time due to the rapid evolution of this uncertain situation.

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 regional competitors, including producers in China. Moreover, Chinese producers have significantly expanded their production capacity in recent years and have also commenced the commercial production of 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, improve the quality of their chloride technology, and continue to improve the quality of their sulfate products. Moreover, we compete with a large number of mining companies with respect to zircon. Zircon producers generally compete on the basis of price, quality, logistics, delivery, and payment terms and consistency of supply.

Within the end-use markets in which we compete, competition between products is intense. We face substantial risk that our customers could switch to our competitors' products in response to any number of developments including lower price offerings by our competitors for substantially the same products, new product development by competitors, increased commercial production of TiO_2 via chloride technology by Chinese producers, greater acceptance of TiO_2 produced via sulfate technology in end-market applications previously characterized by TiO_2 produced via chloride technology, or with respect to zircon customers, switching to lower priced substitute products. Our inability to develop, produce or market our products to compete effectively against our competitors could have a material adverse effect on our business, financial condition, results of operations and cash flow.

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

Our mining, beneficiation, smelting and production processes consume significant amounts of energy and raw materials, the costs of which can be subject to worldwide, as well as, local supply and demand, as well as other factors beyond our control. Fuel and energy linked to commodities, such as diesel, natural gas, heavy fuel oil and pet coke, and other consumables, such as chlorine, sulfuric acid, illuminating paraffin, electrodes, sulfur 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 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. Availability of such consumables could also be impacted by transportation capacity constraints or other interruptions. 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.

Historically, the demand for our products is subject to seasonal fluctuations. TiO_2 is widely used in paint and other coatings where demand increases prior to the painting season in the Northern Hemisphere (spring and summer). Additionally, although zircon is generally a non-seasonal product, it is negatively impacted by the winter and Chinese New Year celebrations due to reduced zircon demand from China. We may be adversely affected by existing or future cyclical changes, and such conditions may be sustained or further aggravated by anticipated or unanticipated changes in regional weather conditions. For example, poor weather conditions in a region can lead to an abbreviated painting season, which can depress consumer sales of paint products that use TiO_2.

We are dependent on, and 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 or deploy highly skilled employees.

We compete with other chemical and mining companies, and other companies generally, in the countries in which we operate to attract and retain key human resources at all levels with the appropriate technical skills and operating and managerial experience necessary to continue operating and expanding our businesses. These operations use modern techniques and equipment and accordingly require various types of skilled workers. The success of our business will be materially dependent upon the skills, experience and efforts of our key officers and skilled employees. Competition for skilled employees may cost us in terms of higher labor costs or reduced productivity. In addition, due to the ongoing COVID-19 pandemic, certain countries in which we operate have imposed stringent travel and immigration restrictions which may further hinder our ability to deploy necessary human resources. As a result, we may not be able to attract, retain and deploy skilled and experienced employees.

Should we lose any of our key personnel or fail to attract, retain and deploy 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 financial condition and results of operations could be adversely affected if we are unable to gauge the direction of commercial and technological progress in key end-use markets or if we fail to fund and successfully develop, manufacture and market products in such changing end-use markets.

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.

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 vertical integration of our operations, could have an adverse effect on the productivity and results of operations of a particular manufacturing facility or on our business as a whole. Furthermore, during operational breakdowns resulting from any such environmental hazard or industrial accident, the relevant facility may not be restored to full operations 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 failures and deterioration of assets may lead to production curtailments, shutdowns or additional expenditures.

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

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

Our 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 in accordance with established guidelines and standards. 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.

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, 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.

RISKS RELATING TO THE GLOBAL NATURE OF OUR BUSINESS

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

We have operations in jurisdictions around the globe which subjects us to a number of risks, including:

- adapting to unfamiliar regional and geopolitical conditions and demands, including political instability, civil unrest, expropriation, nationalization of properties by a government, imposition of sanctions, changes to import or export regulations and fees, renegotiation or nullification of existing agreements, mining leases and permits;
- increased difficulties with regard to political and social attitudes, laws, rules, regulations and policies within countries that favor domestic companies over non-domestic companies, including customer- or government-supported efforts to promote the development and growth of local competitors;
- economic and commercial instability risks, including those caused by sovereign and private debt default, corruption, and new and unfamiliar laws and regulations at national, regional and local levels, including taxation regimes, tariffs and trade barriers, exchange controls, repatriation of earnings, and labor and environmental and health and safety laws and regulations;
- implementation of additional technological and cybersecurity measures and cost reduction efforts, including restructuring activities, which may adversely affect our ability to capitalize on opportunities;
- major public health issues, including the current COVID-19 pandemic, which could cause, and have caused, 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.

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

Our operations in KSA have been affected in the past, and may be affected in the future, by the political, social and economic conditions from time to time prevailing in, or affecting, KSA or the wider Middle East region, including by rocket attacks from armed rebel groups. For example, since 2011, a number of countries in the Middle East region have witnessed significant social unrest, including widespread public demonstrations, and, in certain cases, armed conflict, terrorist attacks, diplomatic disputes, foreign military intervention and a change of government. In addition, KSA faces a number of challenges arising mainly from the relatively high levels of unemployment among the Saudi youth population, requests for political and social changes, and the security threat posed by certain groups. Should KSA experience similar political and social unrest as found in other countries in

the Middle East, the Saudi Arabian economy could be adversely affected, our TiO_2 plant located in Yanbu could be temporarily disrupted or materially adversely affected and our business and operating results could be materially adversely affected.

In addition, the Slagger, that is subject to the Option or Put (as defined elsewhere herein), is located in Jazan, KSA which has been subject to rocket attacks from armed rebel groups fighting the KSA military in Yemen. Further attacks could materially adversely affect our business and operating results.

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

In South Africa, we currently operate two significant mining assets, as well as accompanying separation plants and smelting operations, and derive a significant portion of our profit from the sale of zircon. Our mining and smelting operations depend on electrical power generated by Eskom, the sole, state-owned energy supplier. Eskom has not been able to reliably provide electrical power and as a result “load-shedding” (planned and unplanned rolling power outages) is expected for the foreseeable future. In addition, in 2021, Eskom received a governmental order to reduce by one-third its operating capacity to limit its greenhouse gas emissions. Although Eskom is currently appealing the government order, there is no assurance that Eskom will be successful in its appeal. We have also experienced increased electricity prices and future price increases are expected to occur. Capacity reductions, load shedding, and/or electricity price increases could have a material adverse effect on our business, financial conditions or results of operations.

In addition, our KZN Sands operations currently use approximately 320,000 gigajoules of Sasol gas, which is available only from Sasol Limited. As such, an interruption in the supply of Sasol gas could have a material adverse effect on our business, financial conditions or results of operations.

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

Our operations in South Africa are also reliant on services provided by the State-owned, sole provider of rail transport, Transnet Freight Rail and ocean transport, Transnet National Port Authority (collectively "Transnet"). Furthermore, Transnet provides extensive dockside services at both the ports of Richards Bay and Saldanha Bay. In 2021, the Transnet owned and operated Port of Richards Bay was impacted by two separate events, including a significant fire, which damaged part of the Port's infrastructure, causing increased shipment delays. 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, social and economic risks.

South Africa continues to undergo political, social and economic challenges. For example, in 2021, unprecedented and politically motivated civil unrest in South Africa resulted in significant damage to the national supply chains and logistics. The primary area of unrest was near to our KZN operations. Changes to, or instability in, the economic, social or political environment in South Africa which cause civil unrest, shortages of production materials, interruptions to transportation networks, or labor unrest could result in production delays and production shortfalls, and materially impact our production and results of operations.

The South African government has recently embarked on a process of identifying and securing land for persons who were previously dispossessed of such land as a result of Apartheid policies. In December 2019, the South African government released a draft land expropriation bill for public comment. The land expropriation bill contemplates that, where it is in the “public interest”, land may be expropriated by the South African government, without compensation being payable to the current owners. While the South African government has indicated that such measures will be applied initially to state-owned land, it is possible that such measures may extend to agricultural and mining areas. In the event that the land on which the Namakwa Sands and KZN

Sands operations are situated areas become the subject of a land claim under any such proposed or future land expropriation bill, it may have a material adverse effect on our business, financial condition or results of operations.

The African Government'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.

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

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

Although we believe that our relationships with our various local communities are good, the areas in which our South African operations are situated are the traditional homelands of various tribal groupings that are historically politically volatile. This volatility persists today and frequently results in violent, destructive behaviors. Increased volatility and any consequential civil unrest may result in production stoppages and/or the destruction of assets which comprise our South African operations, any of which could have a material adverse effect on our business, financial condition or results of operations.

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

The U.K. has withdrawn from the E.U. (often referred to as Brexit). Since December 31, 2020, the U.K. has left the E.U. customs union and single market and is no longer required to follow E.U. laws. It is expected that Brexit will impact economic conditions in the U.K. and the E.U. but given the lack of comparable precedent, it is unclear what financial, trade and legal implications the withdrawal of the U.K. from the E.U. will have and how such withdrawal will affect us.

The consequences of Brexit could adversely impact the markets in which we and our customers operate. Brexit could also create uncertainty with respect to the legal and regulatory requirements to which we are subject and lead to divergent national laws and regulations as the U.K. government determines which E.U. laws to replace or replicate. Due to Brexit, adverse consequences such as deterioration in economic conditions, volatility in currency exchange rates or adverse changes in regulation could have a negative impact on our future operations, operating results and financial condition.

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

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

RISKS RELATING TO OUR DEBT AND CAPITAL STRUCTURE

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 company level. 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 the payment of funds by our operating companies in the form of dividends or otherwise. The ability of our operating companies 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 many of other risks described in this section entitled “Risk Factors”.

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, 2021, our total principal amount of debt was approximately $2.6 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 may 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.

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 new mines that replace mines that are end of life, potential expansion or optimization of existing production facilities or mining operations, fund ongoing research and development activities and meet general working capital needs. For instance, in 2020 we began the implementation of a multi-year global digital transformation strategy that is expected to include the establishment of increased automation of both operational and financial systems, including the global ERP, through new and upgraded systems, technology and processes. The risks relating to such digital transformation include any new information and operational technologies not being properly designed, integrated, managed, and/or implemented in a timely manner which could significantly increase the program’s costs, and negatively impact our operations, including, our plant’s system safety, functionality and effectiveness. Although we have taken, and will continue to take, significant steps to mitigate the potential negative impact of the implementation of such new digital systems, there can be no assurance that these procedures will be completely successful. 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 will be contributed together with $322 million of indebtedness currently held by AMIC. Upon exercise of the Option or Put, there can be no assurance that we may assume this indebtedness and may need to obtain funding to repay it at maturity. In the event we require any additional financing, such financing may not be available when needed on terms favorable to us, or at all. If we are unable to obtain adequate funds on acceptable terms, we may be unable to maintain, expand or lower the operating costs of our facilities or take advantage of future opportunities or respond to competitive pressures, which could harm our results of operations, financial condition and business prospects. Additionally, if we undertake these projects, they may not be completed on schedule, at the budgeted cost, or at all. Moreover, our revenue may not increase immediately upon the expenditure of funds on a particular project. As a result, we may not be able to realize our expected investment return, which could adversely affect our results of operations and financial condition.

RISKS RELATING TO OUR LEGAL AND REGULATORY ENVIRONMENT

Our South African mining rights are subject to onerous regulatory requirements imposed by legislation and the Department of Mineral Resources and Energy (the "DMRE"), the compliance with 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, certain of our operations are required to be partially owned by historically disadvantaged South Africans --- known as "empowerment" --- and comply with other provisions of applicable BEE legislation that relate to matters such as mandatory procurement and employment opportunities for the communities in which we operate. On March 1, 2019, a new set of BEE rules and regulations relevant to our operation came into effect known as "Mining Charter III". Under the "empowerment" rules of Mining Charter III, certain of our operations require 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 more stringent requirements applicable to all of our South African operations, including: the procurement of goods and services from BEE compliant entities; race, age and gender based employment quotas; and, workers' housing and living conditions. Uncertainty over the status of Mining Charter III arose when in September 2021, the South African High Court ruled that certain provisions of Mining Charter III were unconstitutional and that Mining Charter III cannot be considered binding legislation. The DMRE is currently considering its options with respect to the court ruling. As a result, there is no assurance that all the provisions of Mining Charter III will take effect or that the DMRE as result of such ruling will not attempt to enforce the same or more onerous provisions through legislative amendments.

Prior to Mining Charter III, BEE in the South African mining sector was governed by Mining Charter II. Under Mining Charter II, our South African operations were "empowered" by a 26% ownership interest in two of our South African subsidiaries by Exxaro which prior to 2017 was greater than 50% owned by historically disadvantaged South Africans. We believe that under Mining Charter III the two South African subsidiaries in which Exxaro previously held 26% became permanently "empowered" --- so-called, "once empowered always empowered".

"Once empowered always empowered" means that a South African company that has had the requisite shareholding base consisting of historically disadvantaged South Africans as at December 31, 2014 will always qualify as an "empowered" entity for purposes of the retention of an existing mining right for the duration of that right. The question of whether the "once empowered always empowered" principle applies in the mining industry in South Africa has been subject to litigation between the Minerals Council of South Africa (the "Minerals Council") (formerly the Chamber of Mines, an industry body that represents approximately 90% of the South African Mining Industry) and the DMRE. The South African High Court decided in the affirmative for the Minerals Council and such decision was subsequently confirmed on appeal. Thus, based on the High Court's ruling, the "once empowered always empowered" principle applies to our existing mining rights. In addition, the South African High Court in connection with its September 2021 decision with respect to the unconstitutionality of Mining Charter III also confirmed that "once empowered always empowered" applies to the renewal and transfer of mining rights. However, there is no assurance that DMRE may not enact new legislation that would undermine the court's ruling regarding the applicability of "once empowered always empowered" to the renewal and transfer of mining rights. In the event that "once empowered always empowered" does not ultimately apply to the renewal or transfer of mining rights it could have a material adverse effect on 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 may be subject to litigation, the disposition of which could have a material adverse effect on our results of operations.

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

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.

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

We are subject to many environmental, health and safety regulations.

Our operations and production facilities are subject to extensive environmental and health and safety laws and regulations at national, international and local levels in numerous jurisdictions relating to use of natural resources, pollution, protection of the environment, mine site remediation, transporting and storing raw materials and finished products, and storing and disposing of hazardous wastes among other materials. Moreover, certain environmental laws impose joint and several and/or strict liability for costs to clean up and restore sites where pollutants have been disposed or otherwise spilled or released. We cannot be certain that we will not incur significant costs and liabilities for remediation or damage to property, natural resources or persons as a result of spills or releases from our operations or those of a third party.

The costs of compliance with the extensive environmental, health and safety laws and regulations or the inability to obtain, update or renew permits required for operation or expansion of our business could negatively impact our results of operations or otherwise adversely affect our business. If we fail to comply with the conditions of our permits governing the production and management of regulated materials, mineral sands mining licenses or leases or the provisions of the relevant jurisdictional laws in which we operate, these permits, mining licenses or leases and mining rights could be canceled or suspended, and we could be prevented from obtaining new mining and prospecting rights, which could materially and adversely affect our business, operating results and financial condition. Additionally, we could incur substantial costs, including fines, damages, criminal or civil sanctions and remediation costs, or experience interruptions in our operations, for violations arising under these laws and regulations, including operating without the required permits, mining licenses or leases and/or mining rights. In the event of a catastrophic incident involving any of the raw materials we use, or chemicals or mineral products we produce, we could incur material costs as a result of addressing the consequences of such event.

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

Our TiO_2 products are subject to increased regulatory scrutiny, that may impede or inhibit widespread usage of TiO_2 and / or diminish the Company's ability to sustain or grow its business or may add significant costs of doing business.

Current regulatory and societal demands for increased protection against products which may cause cancer, genetic mutations or other long-term health problems are resulting in increased pressure for more stringent regulation of our TiO_2 products. We expect these trends to continue and the ultimate cost of compliance could be material. In particular, changes to product safety

regulations could limit the use of, and demand for, our TiO_2 products, require investment in new product development or the way we manufacture our existing products, and increase regulatory compliance expenditures for us and our suppliers.

For instance, the European Commission has recently adopted a regulation classifying certain forms of TiO_2 with a particular aerodynamic diameter as a Category 2 carcinogen by inhalation, with the applicable labelling regulation coming into effect in October 2021. The classification of TiO_2 as a Category 2 Carcinogen 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. The Category 2 classification and labelling requirements 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. For instance, the Health and Safety Executive in the U.K. has published the U.K.'s mandatory classification and labelling list, which includes the classification of TiO_2 as a suspected carcinogen (in a powder form containing 1% or more of particles with aerodynamic diameter ≤ 10 µm). The classification became mandatory in the U.K. in October 2021.

In May 2021, the European Food Safety Authority (EFSA) announced new guidelines which concluded that a certain digestible form of TiO_2 known as E171 is no longer considered safe as a food additive due to uncertainty for genotoxicity. Though we do not manufacture E171, the EFSA guidelines indicate additional regulatory review of our TiO_2 products is likely which could result in more stringent qualifications and use-restriction being applied or to the introduction of further classifications. It is also possible that heightened regulatory scrutiny could lead to claims by consumers or those involved in the production of such products alleging adverse health impacts. In addition, there is no assurance that other materials which we add to our TiO_2 products could also be subject to increased regulation which could impact the cost of labelling or the sales of our products.

ESG issues, including those related to climate change and sustainability, may subject us to additional costs and restrictions, including increased energy and raw material costs, which could have an adverse effect on our business, financial condition and results of operations, as well as damage our reputation.

The majority of our greenhouse gas emissions are generated from our TiO_2 slag furnaces in South Africa, synthetic rutile kiln in Australia, and TiO_2 pigment plants in the United States, United Kingdom, France, Brazil, China, Netherlands, Australia, and Saudi Arabia. Concerns about the relationship between greenhouse gases and global climate change, and an increased focus on carbon neutrality, may result in new or increased legal and regulatory requirements on both national and supranational levels, to monitor, regulate, control and tax emissions of carbon dioxide and other greenhouse gases. A number of governmental bodies have already introduced, or are contemplating, regulatory changes in response to climate change, including regulating greenhouse gas emissions. Any laws or regulations that are adopted to reduce emissions of greenhouse gases could, among other things, (i) cause an increase to our raw material costs, (ii) increase our costs to operate and maintain our facilities, and (iii) increase costs to administer and manage emissions programs.

In addition, companies across all industries are facing increasing scrutiny relating to their ESG policies. Increased focus and activism related to ESG may hinder the Company's access to capital, as investors may reconsider their capital investment as a result of their assessment of the Company's ESG practices. In particular, customers, investors and other stakeholders are increasingly focusing on environmental issues, including climate change, water use, and other sustainability concerns. Moreover, increased regulatory requirements, including in relation to various aspects of ESG including disclosure requirements, may result in increased compliance or input costs of energy, raw materials or compliance with emissions standards, which may cause disruptions in the manufacture of our products or an increase in operating costs. Any failure to achieve our ESG goals or a perception of our failure to act responsibly with respect to the environment or to effectively respond to new, or changes in, legal or regulatory requirements concerning environmental or other ESG matters, or increased operating or manufacturing costs due to increased regulation, could adversely affect our business, financial condition and results of operations, as well as our reputation.

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. Further, third parties may claim that we infringe on their intellectual property rights which could result in costly litigation.

Our success depends to a significant degree upon our ability to protect and preserve our patents and unpatented proprietary technology, operational knowledge and other trade secrets (collectively "intellectual property rights"). 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. 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.

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.

RISKS RELATING TO ACCOUNTING AND TAXATION

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 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.

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

Our ability to use net operating losses (“NOLs”) and Section 163(j) interest expense carryforwards generated by us could be substantially limited if we were to experience an “ownership change” as defined under Section 382 of the U.S. Internal Revenue Code of 1986, as amended ("the Code"). In general, an ownership change would occur if our “5-percent shareholders,” as defined under Section 382 of the Code and 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. Although we believe we have sufficient protection of our approximately $4.3 billion of NOLs and/or approximately $856 million 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 certain pre-ownership change losses and/or credits. Such a limitation could, for any given year, have the effect of increasing the amount of our U.S. federal and/or state 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 could be subject to changes in tax rates, adoption of new tax laws or additional tax liabilities.

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

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

From time to time, we may announce certain key financial and non-financial targets that are expected to serve as benchmarks for our performance for a given time period, such as, projections for our future revenue growth, Adjusted EBITDA, Adjusted

diluted earnings per share and free cash flow. Our failure to meet one or more of these key financial targets may negatively impact our results of operations, stock price, and stockholder returns. The factors influencing our ability to meet these key financial targets include, but are not limited to, changes in the global economic environment relating to our TiO_2 products and zircon, changes in our competitive landscape, including our relationships with new or existing customers, our ability to introduce new products, applications, or technologies, our undertaking an acquisition, joint venture, or other strategic arrangement, and other factors described within this Item 1A – Risk Factors, many of which are beyond our control.

RISKS RELATING TO INVESTING IN OUR ORDINARY SHARES

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

As of December 31, 2021, Cristal Inorganic, an affiliate of Cristal owned approximately 24% of our outstanding ordinary shares. As such, Cristal Inorganic 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 may not always coincide with our interests or the interests of our other shareholders. Also, Cristal Inorganic may seek to cause us to take courses of action that, in their judgment, could enhance their investment in us, but which might involve risks to our other shareholders or adversely affect us or our other shareholders.

In addition, under the shareholders agreement (the "Cristal Shareholders Agreement") we entered into at the closing of the Cristal Transaction with Cristal, as long as Cristal Inorganic and the three shareholders of Cristal (collectively, the "Cristal Shareholders") collectively beneficially own at least 24,900,000 or more of our ordinary shares, they have the right to designate for nomination two directors of our board of directors (the "Board"). As long as the Cristal Shareholders collectively beneficially own at least 12,450,000 ordinary shares but less than 24,900,000 ordinary shares, they have the right to designate for nomination one director of the Board. The Cristal Shareholders Agreement also provides that as long as the Cristal Shareholders collectively beneficially own at least 12,450,000 ordinary shares they have certain preemptive rights. Also, pursuant to the Cristal Shareholders Agreement, we have filed a universal shelf registration statement which is currently effective and which currently would cover 6,532,738 shares owned by Cristal. Other than with respect to those shares, the Cristal Shareholders Agreement includes certain restrictions on Cristal Inorganic's ability to transfer any of its ordinary shares prior to December 31, 2022 if such transfer would cause an "ownership change" as defined under Section 382 of the Internal Revenue Code.

As a result of these or other factors, including as a result of any 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.

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

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

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

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

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

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

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

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

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

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

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

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

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

transfer can be registered in our books. However, if those shares are redeposited into DTC, the redeposit will attract stamp duty or SDRT at the rate of 1.5% to be paid by the transferor.

We have put arrangements in place such that directly held ordinary shares cannot be transferred into the DTC system until the transferor of the ordinary shares has first delivered the ordinary shares to a 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.

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

Our articles of association provide that the courts of England and Wales have exclusive jurisdiction to determine any dispute brought by a shareholder in that shareholder's capacity as such, or related to or connected with any derivative claim in respect of a cause of action vested in us or seeking relief on our behalf, against us and/or the board and/or any of the directors, former directors, officers, employees or shareholders individually, arising out of or in connection with our articles of association or (to the maximum extent permitted by applicable law) otherwise. This choice of forum provision may limit a shareholder's ability to bring a claim in a judicial forum that the shareholder believes is favorable for disputes with us or our directors, former directors, officers, employees or shareholders which may discourage lawsuits against us and our directors, former directors, officers, employees or shareholders.

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

We are incorporated under the laws of England and Wales and a substantial portion of our assets are located outside of the U.S. The U.S. and the U.K. do not currently have a treaty providing for the recognition and enforcement of judgments, other than arbitration awards, in civil and commercial matters. The enforceability of any judgment of a U.S. federal or state court in the U.K. will depend on the laws and any treaties in effect at the time, including conflicts of laws principles (such as those bearing on the question of whether a U.K. court would recognize the basis on which a U.S. court had purported to exercise jurisdiction over a defendant). In this context, there is doubt as to the enforceability in the U.K. of civil liabilities based solely on the federal securities laws of the U.S. In addition, awards for punitive damages in actions brought in the U.S. or elsewhere may be unenforceable in the U.K.. An award for monetary damages under U.S. securities laws would likely be considered punitive if it did not seek to compensate the claimant for loss or damage suffered and was intended to punish the defendant.

Item 1B. Unresolved Staff Comments

Not applicable.

Item 2. Properties

Below are our primary offices and facilities at December 31, 2021. We believe our properties are in good operating condition, and are well maintained. Pursuant to separate financing agreements, substantially all of our material U.S., European and Australian properties are pledged or encumbered to support or otherwise provide security for our indebtedness.

Our primary office locations consisted of the following:

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

Overview of Our Vertical Integration

Tronox is the world's leading vertically integrated manufacturer of TiO_2 pigment. We produce the majority of our internal TiO_2 pigment feedstock requirements internally at our mine and mineral processing facilities. Our supply chain consists of mining operations in South Africa and Australia, separation and upgrading facilities located near our mines where we separate and process raw ore and then “upgrade” the titanium content of the raw ore to produce specialized chloride TiO_2 feedstock materials (titanium slag and synthetic rutile) and nine TiO_2 pigment production facilities located on six continents. The internal TiO_2 feedstocks we produce include titanium slag, synthetic rutile, natural rutile, leucoxene, chloride ilmenite and sulfate ilmenite.

As part of our TiO_2 value chain, we explore, acquire, mine and process heavy mineral sands to produce Heavy Mineral Concentrate ("HMC") from which the Valuable Heavy Mineral (VHM) titanium and zircon products are made. HMC is produced from heavy mineral sands primarily through spiral gravity concentration at our mines. Mined material is transported to our nearby integrated mineral separation plants (MSP) to separate and concentrate VHMs by gravity, magnetic and electrostatic techniques. Multiple grades of titanium minerals and zircon may be produced from each MSP. The three titanium feedstocks which result from the MSP process (natural rutile, leucoxene and ilmenite) are each handled differently. Natural rutile and leucoxene are ordinarily shipped from the MSP to one of our TiO_2 pigment production facilities. Depending on the TiO_2 content of mined ilmenite, we either use it directly to produce TiO_2 pigment or we upgrade it to produce titanium slag at our two South African smelter operations and synthetic rutile (SR) at our Chandala metallurgical complex in Western Australia. Our internally sourced titanium mineral products provide a secure, long-term low-cost supply of high-grade feedstock for our TiO_2 pigment manufacturing facilities.

There is a high degree of substitutability among natural rutile, synthetic rutile, titanium slag, leucoxene and chloride ilmenite as titanium feedstocks for chloride pigment production. 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 value-added supply chain, with final product prices for TiO_2 pigment, typically significantly higher than that of chloride or sulfate ilmenite, the backbone of the global titanium mineral supply. The revenue assumptions for titanium feedstocks we applied to determine our reserve estimates, as described below, are based on market intelligence gathered from internal and external experts, sales contracts and historic pricing. The economic assessment is done on a minerals only basis and no value of downstream upgrading is attributed to the minerals units.

In 2021, we produced concentrates of ilmenite, rutile, leucoxene, and zircon from five operations:

- Namakwa Sands, Western Cape, South Africa;
- KwaZulu-Natal ("KZN") Sands, KwaZulu-Natal, South Africa;
- Northern Operations, Western Australia;
- Southern Operations, Western Australia; and
- Eastern Operations, Murray Basin, New South Wales, Australia.

Ilmenite from our Namakwa and KZN Sands mines in South Africa is converted to titanium slag at our smelters at Saldanha Bay, Western Cape and Empangeni, KwaZulu-Natal, respectively. Ilmenite from our Cooljarloo mine in Western Australia is converted to SR at our Chandala metallurgical complex which is most commonly used as feedstock to our TiO_2 pigment plants at Kwinana and Kemerton, both of which are south of Perth in Western Australia.

Mining Operations

Tronox owns and operates five mining and mineral processing operations, each including one or more heavy mineral sand ("HMS") mines producing HMC which is separated into valuable co-products, primarily zircon, and TiO2 feedstocks --- ilmenite, natural rutile or leucoxene --- in a dedicated mineral separation plant.

In South Africa, the Namakwa Sands operations include two open-pit mines at Brand-se-Baai, each with a dedicated primary gravity concentration plant and a secondary concentration plant (SCP) that processes the HMC from both primary plants. Products from the SCP are further processed to finished mineral products at a nearby mineral separation plant (MSP) in Koekenaap. Ilmenite product is further processed into titanium slag and pig iron at a two-furnace smelter at Saldanha, Western Cape, South Africa which is two hundred kilometers south of Koekenaap. The KZN operations have an open pit hydraulic mine at Fairbreeze with a primary gravity concentration plant, a mineral separation plant at nearby Empangeni alongside a two-furnace smelter complex, and export facilities at the port of Richards Bay.

In Australia, the Northern Operations consist of the Cooljarloo dredge mine and floating primary gravity concentration plant, and the Chandala metallurgical complex, consisting of a mineral separation plant and SR plant. The Southern Operations consist of a dry open pit mine and primary concentration at Wonnerup and a mineral separation plant at Bunbury.

The Eastern Operations in the Murray Basin of Australia include two operating dredge mines at Ginkgo and Snapper and a mineral separation plant at Broken Hill, NSW. As the Gingko and Snapper mines are expected to be mined until at least 2023, we are developing and will be commissioning another mine in the Eastern Operations, Atlas Campaspe, intended to seamlessly replace the Ginkgo and Snapper mines. Our pre-mining feasibility work indicates that this mine is abundant in natural rutile and high-value zircon, and will be a significant source of high grade ilmenite suitable for direct use or upgraded feedstock production.

Figure 1 Showing global site and offices including locations with resources and reserves.

Pigment Operations

Our pigment production facilities utilize the titanium mineral feedstock from our mining and processing operations to produce TiO_2 pigment products. The following table lists our TiO_2 pigment production facilities and capacity (in metric tonnes per year), by location:

Facility	Production	TiO2 Capacity	Process
Hamilton, Mississippi, USA	TiO_2	225,000	Chloride
Yanbu, Saudi Arabia	TiO_2	200,000	Chloride
Stallingborough, England, United Kingdom	TiO_2	165,000	Chloride
Kwinana, Western Australia	TiO_2	150,000	Chloride
Kemerton, Western Australia	TiO_2	110,000	Chloride
Botlek, the Netherlands	TiO_2	90,000	Chloride
Salvador, Bahia, Brazil	TiO_2	60,000	Sulphate
Fuzhou, Jiangxi Province, China	TiO_2	46,000	Sulphate
Thann, Alsace, France	TiO_2	32,000	Sulphate

Mineral Properties

Reporting of Reserves and Resources

U.S. registrants are required to report resources and reserves in accordance with the amendments finalized in February 2019 to Item 102 of Regulation S-K(Subpart 1300). These amendments were intended to modernize the disclosure requirements for properties owned or operated by mining companies to provide investors with a more comprehensive understanding of a registrant's mining properties.

Our mineral resource and reserve estimates are based on extensive geological resource models modified by various mining and processing factors and assessed in a techno-economic model for commercial viability. This constitutes a Life-of-Mine-Plan (LOMP) for each operation. Our LOMP and reserve estimates are optimized with respect to anticipated revenues and costs. Assumptions are developed from our extensive experience and include mining parameters, processing recoveries, operating costs, foreign exchange, and rehabilitation. Each of our operations reconcile predicted mining and processing metrics with actual production and recovery data on a monthly basis. Our models are updated as necessary and used to determine ore boundaries based on economic assumptions. To satisfy the disclosure rules the nominal cut-off grades used to define resources are, generally: 0.3% zircon at Namakwa Sands; 1.5% ilmenite at KZN Sands; 1.0% Total Heavy Minerals ("THM") at our Northern Operations, Western Australia, 3% THM at our Southern Operations, Western Australia, and 1% THM at our Eastern Operations, Murray Basin, Australia. Actual cut-off grades applied in estimates can vary according to numerous factors, such as mining method, overburden: ore ratios, and heavy mineral ("HM") assemblage quality. For reserves where there is substantial asset investment post the minerals production stage, parameters that best utilize the whole value chain may take precedence over maximizing value from the minerals business unit, therefore impacting the optimal mining shell and effective cut-off grade.

Not all HMS deposits are alike. Our reserves, as set forth in the table below, have a higher confidence level because we have undertaken sufficient drilling density and validation. Resources present unconfirmed continuity and variability in grade, HM assemblage, or other characteristics, as well as the indeterminate impact of modifying factors, and hence are not classified as reserves.

Within the broad category of resources, inferred resources have a lower level of geological confidence than do indicated resources with measured resources being the highest confidence level from a geological perspective. Only indicated resources and measured resources can be converted to reserves with proven reserves having a higher level of economically exploitable confidence than probable reserves. The summary table of our reserves below have been determined to be economically-exploitable by individuals competent and qualified to act under the new disclosure requirements as "Qualified Persons".

Mining and Mineral Tenure

S-K Subpart 1300 requires us to describe our rights to access and mine the minerals we report as reserves and to disclose any change in mineral tenure of material significance. Our heavy mineral exploration and mining activities in South Africa and Australia are regulated by the South African Department of Mineral Resources, the Western Australia Department of Mines, Industry Regulation and Safety and the New South Wales Department of Planning, Industry and Environment. All exploration and mining activities are subject to multiple levels of environmental regulatory review, including approvals of environmental plans and public comment periods as pre-conditions to granting of mineral tenure.

Mineral Tenure - South Africa

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

Mining right applications require additional approvals by the Department of Environmental Affairs ("DEA") of an Environmental Management Program ("EMP") and an Integrated Water and Land Use License.

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

On the Western Cape of South Africa, Tronox holds mining rights over an area of 19,205 hectares (47,457 acres) and surface rights totaling 17,111 hectares (43,542 acres) at the active mining site near Brand-se-Baai, commonly referred to as our Namakwa Sands operation. On the Eastern coast of South Africa, Tronox controls mining and prospecting rights covering approximately 4,041 hectares (9,986 acres) at KZN, where surface access rights are either owned directly by KZN Sands or secured by agreements with Mondi Ltd. A further 4,790 hectares (11,836 acres) of prospecting rights are held by a direct, wholly-owned subsidiary of KZN Sands at the nearby Port Durnford and Waterloo project areas which we are currently in the process of converting into a mining right.

Mineral Tenure - Australia

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

At the Northern Operations in Western Australia, Tronox controls mining leases, exploration and other licenses and rights covering a total 50,838 hectares (125,623 acres). Mining and Public Environmental Review plans are approved for the Cooljarloo mine and approval to extend the environmental plans for Dongara were recently approved. Environmental Protection Agency approval of Cooljarloo West has also been approved. The main Cooljarloo deposit covers 9,744 hectares (24,078 acres). We hold 14 mining leases at the Dongara project. Three older mining leases are held at our Jurien property, the site of a former heavy minerals open pit mine operated by another party in the 1970's.

As part of our acquisition of Cristal which closed in 2019, Tronox acquired mining and exploration licenses totaling 559,682 hectares (1,383,004 acres) in the South Perth Basin and Murray Basin heavy mineral provinces of Australia.

The Southern Operations in the southwest of Western Australia comprises 30 mining leases, 5 exploration licenses, 3 retention licenses, 2 general purpose leases and 2 miscellaneous licenses totaling 16,178 hectares.

Tronox holds 4 mining leases, 15 exploration licenses and 2 retention licenses in our Eastern Operations in the Murray Basin of New South Wales, Victoria and South Australia. The tenements cover approximately 524,400 hectares (2,025 sq miles). Three mining leases west of Pooncarie, NSW cover approximately 6,720 hectares (16,605 acres) surrounding our active mines at Snapper, Ginkgo and Crayfish. One mining lease of 2,330 hectares is at the Atlas Campaspe mining project in NSW.

Mineral Sands - South Africa and Australia

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

Not all heavy minerals have commercial value, and a distinction is made between the Total Heavy Minerals ("THM") and Valuable Heavy Minerals ("VHM"). Typical VHM assemblages include the titanium-iron oxide mineral, ilmenite ($FeTiO_3$); rutile, a premium TiO_2 feedstock mineral; leucoxene, a natural alteration product of weathered ilmenite; and zircon, a zirconium silicate ($ZrSiO_4$) valuable for its use in a diverse range of industrial and construction applications. Other HM of commercial value, such as garnet, staurolite, kyanite and monazite, may be recovered as by-products.

Of interest recently is the potential use of monazite, both in contained ore bodies and in stockpiled sources located near the mineral separation processes at Namakwa Sands. Monazite has increasing commercial value due to a high concentration of rare earth metals which can be separated by well-established methods. Rare earths are expected to remain in high demand as demand grows for electric vehicles, wind turbines, and consumer goods that require rare earth-containing permanent magnets. We currently do not know the metallurgical recovery potential for the monazite as our processes have historically focused on traditional value minerals. Given the increasing importance of monazite, we are evaluating new processes to better understand the grade and recoverability of monazite in our mining tenements.

TRONOX MINERAL SAND - 2021 AGGREGATE MINERAL PRODUCTION FOR THE PAST THREE YEARS (metric tonnes per year)

Product	2021	2020	2019
Rutile[(1)]	141,594	168,258	159,311
Ilmenite[(2)]	1,190,981	1,188,051	1,222,681
Zircon[(3)]	219,825	245,471	266,321

(1) includes natural rutile + leucoxene
(2) includes multiple grades of TiO_2 grades of ilmenite
(3) includes multiple grades of zircon

Namakwa Sands, Western Cape, South Africa

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

Ore is excavated from two open-pit dry mines and delivered by trucks and conveyors to two primary wet concentration plants. Heavy Mineral Concentrate is separated into magnetic and non-magnetic fractions at a secondary concentration plant at the mine. The two fractions are further processed at a mineral separation plant 52 km south at Koekenaap. Ilmenite, rutile and zircon are transported by rail from Koekenaap to Saldanha Bay, where ilmenite is smelted in a two-furnace complex into titanium slag and pig iron. Chloride-grade slag, slag fines, pig iron, rutile and zircon are exported from our dedicated facilities at the Saldanha Bay deep-water port, approximately 150 km north of Cape Town.

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

KZN Sands, KwaZulu-Natal, South Africa

KZN Sands operates the open-cut Fairbreeze mine, just south of the coastal town of Mtunzini, the Central Processing Complex, 30 km west of Richards Bay, and bulk export facilities at the port of Richards Bay.

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

The Fairbreeze deposit is hosted by a complex of strandline/paleo-dune couplets, approximately two kilometers inland from the modern coastline, forming an elongate ridge extending 12 km south-southwesterly from the town of Mtunzini with a maximum width of approximately two kilometers. No overburden is present. Modern erosion has dissected the deposit into five discrete ore bodies 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.

Northern Operations, Western Australia

Our mineral properties of the coastal plain of Western Australia are located within two historically important heavy mineral provinces. Our combined Cooljarloo dredge mine and planned Cooljarloo West dredge mine, 170 km north of Perth, contain proven and probable reserves shown in the tables below.

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

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

At Dongara, multiple studies, drilling, and dry-mining optimization over the past 15 years identified reserves of 68 million tonnes of ore at an average grade of 5.1% THM in five deposits, for which mining and environmental approvals have been secured. Tronox has chosen not to upgrade the studies to a current feasibility level and consequently has reported only resources for the Dongara project.

Heavy mineral deposits of our Northern Operations generally occur as stacked, elongate, NNW-trending bodies parallel to the modern coastline, bounded to the east by the Gingin Scarp. A swarm of HM deposits in the Cooljarloo district span an area of 40 km NNW by a width of over 5 km. Heavy minerals derived from the crystalline “basement” of the Yilgarn craton east of the scarp and Mesozoic sediments of the North Perth Basin west of the scarp are associated with marine still-stands on a wave-cut platform, as HM sands accumulated in shoreline, dunal and other coastal environments of a westward-regressing seacoast.

Southern Operations, Western Australia

Our mineral properties in the South-West of Western Australia were acquired in the Cristal transaction in 2019.

We extract heavy minerals from the Wonnerup North open-cut HMS mine, 10 km east of Busselton, from which HMC is trucked to our MSP at Bunbury, adjacent to the Bunbury port. The Bunbury MSP also processes streams of non-magnetic zircon and rutile rich HM concentrates from our Broken Hill MSP in New South Wales.

Ilmenite-dominant heavy mineral deposits of the South Perth Basin occur as multiple, arcuate bands, parallel to the J-shaped Geographe Bay modern shoreline.

The Wonnerup North deposit is a shallow (~3m deep) windblown dunal deposit on the Capel paleo-shoreline, one of two strandlines, along with the Yoganup paleo shoreline, located 7 km and 15 km inland, respectively, from the modern Indian Ocean coast associated with most of the economic HMS deposits of the region.

Eastern Operations, Murray Basin, New South Wales, Australia

Our Eastern Operations are located in the Murray Basin, a 300,000-square-kilometer intra-cratonic sedimentary basin covering parts of Victoria, New South Wales, and South Australia. Our operating mines of Snapper, Ginkgo and Crayfish are approximately 40 km west of Pooncarie, New South Wales. Overburden at our Snapper and Ginkgo mines is removed by conventional mining methods, followed by dredge mining of ore. Dry-mining at Crayfish, a small deposit adjunct to Ginkgo, started in September 2019, from which ore is hauled to the Ginkgo dredge pond.

HMC from Ginkgo-Snapper is hauled by trucks approximately 240 km to our MSP in Broken Hill, NSW. The Broken Hill MSP utilizes magnetic separation techniques to produce commercial concentrates of ilmenite and leucoxene, and a non-magnetic HM concentrate. The products are railed approximately 430 km to the port of Adelaide, South Australia. The non-magnetic concentrates are then shipped to the Bunbury MSP for further processing into final products. At current production rates, mining is expected to continue at Snapper Ginkgo and Crayfish until at least 2023.

Construction at our two new open-cut dry mines at Atlas/Campaspe, 150km east of the current operations and 90 km north of Balranald, NSW and approximately 270 km southeast of Broken Hill is nearly complete. Starting with Atlas in 2022, the new production will be phased in to sustain VHM output from our Eastern Operations, as Snapper, Ginkgo and Crayfish reach depletion. HMC produced on-site at Atlas and Campaspe by wet gravity separation will be delivered to the Broken Hill MSP via a combination of road and rail transport. Active exploration programs are ongoing in the Murray Basin heavy minerals province, where our exploration licenses cover nearly 5,100 square kilometers.

Further description of each of our mining projects described above are included in our exhibit filings.

Heavy Mineral Reserves

All of our reserves are reported on the basis of our 100% ownership 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 appropriate resource estimates. Our residual resources are those areas of mineralized ground which have either had insufficient drilling to confidently define the shape, grade and recoverability of the valuable minerals as well as not yet having been subjected to a detailed assessment of the impact of validated “modifying factors” on the revenue generating potential of a deposit.

For clarity, in the tables below, our reserves have been excised from the resources as they can be proven to be profitably mined and processed. The remaining deposit that exceeds cut-off grade, but have not yet been demonstrated to be profitable by virtue of either recoverable grade, operating cost or capital required to develop, are separately defined as resources.

The following tables summarize our reserves and resources as well as their contained in situ THM and HM assemblages as of December 31, 2021.

TRONOX MINERAL SANDS - 2021 RESERVES

				Mineral Assemblage (% of THM)			
MINE / DEPOSIT	**Reserve Category**	**Material (million tonnes)**	**HM%**	**Ilmenite**	**Rutile and Leucoxene**	**Zircon**	**Change (+/-) from 2020 (%)[1]**
Namakwa Sands Dry Mine - Western Cape RSA							
	Proven	148	7.8 %	37.0	8.6	9.0	
	Probable	555	5.4 %	53.7	11.1	11.4	
	Total Reserves	**703**	**5.9 %**	**49.0**	**10.4**	**10.7**	**(3.3)**
KZN Sands Hydraulic Mine KwaZulu-Natal RSA							
	Proven	206	5.6 %	61.6	7.3	7.7	
	Probable	11	3.7 %	51.9	5.0	7.0	
	Total Reserves	**217**	**5.5 %**	**61.3**	**7.2**	**7.7**	**(3.7)**
Cooljarloo – Dredge Mine Western Australia							
	Proven	231	1.7 %	61.1	7.7	10.5	
	Probable	130	2.0 %	60.5	8.3	12.3	
	Total Reserves	**361**	**1.8 %**	**60.8**	**7.9**	**11.2**	**—**
Atlas-Campaspe Dry Mine in Development, New South Wales Australia							
	Proven	51	7.3 %	60.6	13.5	11.8	
	Probable	56	5.4 %	60.3	10.0	13.1	
	Total Reserves	**107**	**6.3 %**	**60.5**	**11.9**	**12.4**	**17.1**
Wonnerup Dry Mine Western Australia							
	Proven	12	5.5 %	70.7	18.4	9.7	
	Probable	4	5.7 %	78.0	11.1	8.8	
	Total Reserves	**16**	**5.5 %**	**72.8**	**16.3**	**9.4**	**(11.8)**
Ginkgo-Snapper Dredge/ Dry Mines, New South Wales Australia							
	Proven	36	2.0 %	52.1	16.8	12.7	
	Probable	—	—	—	—	—	
	Total Reserves	**36**	**2.0 %**	**52.1**	**16.8**	**12.7**	**(42.4)**
Total Reserves							
	Proven	684	4.7 %	52.5	9.0	9.1	
	Probable	756	4.8 %	54.9	10.8	11.6	
	Total Reserves	**1,440**	**4.7%**	**53.8**	**9.9**	**10.4**	**(8.7)**

[1] Changes are predominantly due to depletion as a result of mining offset by an increase related to our Atlas Campaspe mine and other reclassifications.

TRONOX MINERAL SANDS - 2021 RESOURCES

MINE / DEPOSIT	Resource Category	Material (million tonnes)	HM%	Mineral Assemblage (% of THM)		
				Ilmenite	Rutile and Leucoxene	Zircon
Namakwa Sands Dry Mine - Western Cape RSA						
	Measured	110	7.3	31.6	5.7	
	Indicated	86	6.5	28.3	5.6	
	Measured + Indicated	196	6.9	30.1	5.7	
	Inferred	110	5.5	35.1	8.1	
	Total	**306**	**6.4**	**31.9**	**6.5**	
KZN Sands Hydraulic Mine KwaZulu-Natal RSA						
	Measured	50	4.1	64.1	8.1	
	Indicated	1	2.0	53.5	7.0	
	Measured + Indicated	51	4.0	63.9	8.1	
	Inferred	56	3.4	54.7	6.9	
	Total	**107**	**3.7**	**59.1**	**7.5**	
Cooljarloo – Dredge Mine Western Australia						
	Measured	10	1.5	59.4	7.8	
	Indicated	282	1.5	61.4	6.7	1
	Measured + Indicated	292	1.5	61.3	6.8	1
	Inferred	—	—	—	—	
	Total	**292**	**1.5**	**61.3**	**6.8**	**1**
Dongara Planned Dry Mine Western Australia						
	Measured	109	4.1	50.2	9.0	1
	Indicated	31	3.5	53.7	9.1	1
	Measured + Indicated	140	3.9	52.0	9.1	1
	Inferred	38	2.7	54.6	8.7	
	Total	**178**	**3.7**	**51.5**	**9.0**	**1**
Atlas-Campaspe Dry Mine in Development, New South Wales Australia						
	Measured	31	2.6	58.7	10.8	1
	Indicated	—	—	—	—	
	Measured + Indicated	31	2.6	58.7	10.8	1
	Inferred	83	3.1	60.1	5.8	1
	Total	**114**	**3.0**	**59.8**	**7.0**	**1**
Port Durnford - KwaZulu-Natal RSA						
	Measured	143	4.5	67.6	6.0	
	Indicated	340	4.1	67.4	6.1	
	Measured + Indicated	483	4.2	67.5	6.1	

	Inferred	466	3.5	71.8	6.3	1
	Total	**949**	**3.9**	**69.4**	**6.2**	
Wonnerup Dry Mine Western Australia						
	Measured	13	4.7	77.5	12.0	
	Indicated	7	4.6	86.9	3.3	
	Measured + Indicated	20	4.7	80.7	9.1	
	Inferred	4	4.4	84.0	4.0	
	Total	**24**	**4.6**	**81.2**	**8.3**	
Ginkgo-Snapper Dredge/ Dry Mines, New South Wales Australia						
	Measured	79	1.4	48.5	17.7	1
	Indicated	—	—	—	—	
	Measured + Indicated	79	1.4	48.5	17.7	1
	Inferred	59	1.1	47.9	17.9	1
	Total	**138**	**1.2**	**48.3**	**17.8**	**1**
Kara/Cylinder New South Wales Australia						
	Measured	—	—	—	—	
	Indicated	175	4.1	44.9	12.7	1
	Measured + Indicated	175	4.1	44.9	12.7	1
	Inferred	26	2.7	54.4	24.4	1
	Total	**201**	**3.9**	**45.7**	**13.7**	**1**
Total Resources						
	Measured	545	4.3	50.7	7.5	
	Indicated	922	3.5	54.6	7.6	
	Measured + Indicated	1,467	3.8	53.0	7.6	
	Inferred	842	3.5	60.7	7.4	
	Total	**2,309**	**3.7**	**55.6**	**7.5**	

Abbreviations, Definitions, and Notations

One metric tonne = 1.10231 short tons

Reserves —mineralized material inclusive of dilution, determined to be economically and legally exploitable as of December 31, 2021, classified as either Probable Reserves or Proven Reserves, based on level of confidence.

Resources – mineralized ground which has either had insufficient drilling to confidently define the shape, grade and recoverability of the valuable minerals as well as not yet having been subjected to a detailed assessment of the impact of validated modifying factors on the revenue generating potential of a deposit.

LOMP — Life-of-Mine-Plans (LOMPs) have been developed for each mine site by teams of Tronox professionals based on 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.

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

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

Minor computational discrepancies may be due to rounding.

Cooljarloo Dredge Mine reserves include Cooljarloo and Cooljarloo West

Key Assumptions — economic viability is determined by techno-economic modeling that integrates geological, analytical and geotechnical databases, mining parameters, metallurgical recoveries, known or forecast operating costs, cost of capital, and product sales prices at time of production. Historical sales prices by themselves are unreliable predictors of future prices, and our forecasts are based on our private contracts, internal and external market research.

Disclosures of mineral reserves traditionally include a cut-off grade, the grade in a mineral deposit below which material cannot be profitably mined and processed. However, economic exploitability is determined by many modifying factors other than grade, and most modern mining operations, including ours, use detailed computer models utilized by employees who possess the experience and technical expertise to identify what parts of a deposit are economically exploitable. As cut-off grades remain entrenched in the mining industry, the following nominal cut-off grades apply, with qualifications, to our five operations: 0.3% zircon at Namakwa Sands; 1.5% ilmenite at KZN Sands; 1.3% THM (approximately 1% VHM) at our Northern Operations, WA, 3% THM at our Southern Operations, WA, and 1% THM at our Eastern Operations, NSW.

Production forecasts of commercial-quality titanium mineral and zircon concentrates from reserves are taken from our Life-of-Mine Plans. Mining recoveries are typically close to 100%, but metallurgical recoveries in each concentration step can vary widely, as a function of ore and mineral characteristics. We apply recovery factors based on actual operating data.

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.

Item 3. Legal Proceedings

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

SEC Regulations require us to disclose certain information about administrative or judicial proceedings to which a governmental authority is party arising under federal, state or local environmental provisions if we reasonably believe that such proceedings may result in monetary sanctions above a stated threshold. Pursuant to the SEC regulations, the Company uses a threshold of $1 million or more for purposes of determining whether disclosure of any such proceedings is required.

Item 4. Mine Safety Disclosures

None.

PART II

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

Market for our Ordinary Shares

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

Holders of Record

As of January 31, 2021, there were approximately 55 holders of record of ordinary shares. This does not include the shareholders that held shares of our ordinary shares in a nominee or "street-name" accounts through banks or broker-dealers. See Item 12, Security Ownership of Certain Beneficial Owners and Management and Related Shareholder Matters.

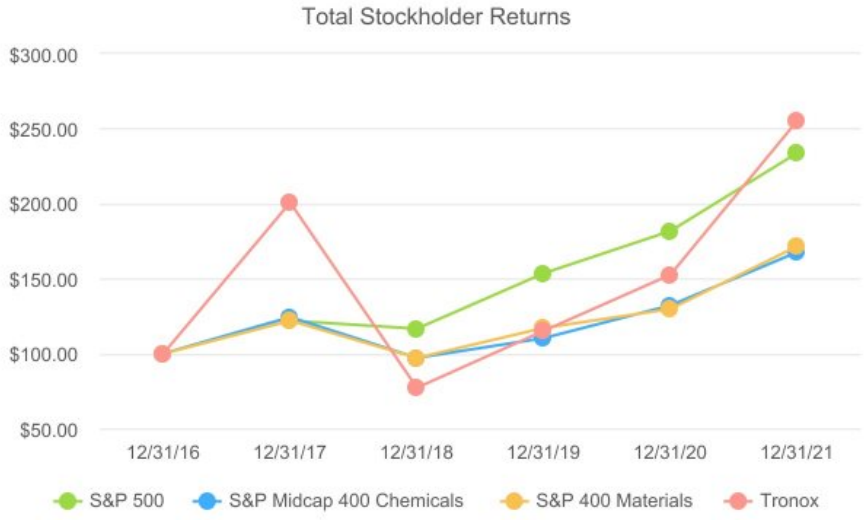
Issuer Purchases of Equity Securities

2021	Total Number of Shares Purchased	Weighted Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plan[1]	Maximum Approximate Dol Value that May Yet be Purch Under the Plan[1]
October 1 - October 31	—	$ —	—	— $
November 1 - November 30	—	—	—	300,000,
December 1 - December 31	—	—	—	300,000,
Total	—	$ —	—	— $ 300,000,

(1) On November 9, 2021, the Company announced that the Company's Board of Directors has authorized the repurchase of up to $300 million of the Company's ordinary shares, par value $0.01 per share (the "ordinary shares"), through February 2024. During the year ended December 31, 2021, the Company did not repurchase any shares under the Company's share repurchase plan.

Stock Performance Graph

The following graph presents the five-year cumulative total stockholder returns for our ordinary shares compared with the Standard & Poor's ("S&P") 500, the S&P MidCap 400 Chemicals and the S&P 400 Materials indices.



The graph assumes that the values of our ordinary shares, the S&P 500, the S&P MidCap 400 Chemicals index, and the S&P 400 Materials index were each $100 on December 31, 2016, and that all dividends were reinvested.

Item 6. Selected Financial Data

Not applicable.

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

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

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

Executive Overview

Tronox Holdings plc (referred to herein as "Tronox", "we", "us", or "our") operates titanium-bearing mineral sand mines and beneficiation operations in Australia, South Africa and Brazil to produce feedstock materials that can be processed into TiO_2 for pigment, high purity titanium chemicals, including titanium tetrachloride, and Ultrafine© titanium dioxide used in certain specialty applications. It is our long-term strategic goal to be vertically integrated and consume all of our feedstock materials in our own nine TiO_2 pigment facilities which we operate in the United States, Australia, Brazil, UK, France, the Netherlands, China and the Kingdom of Saudi Arabia ("KSA"). We believe that vertical integration is the best way to achieve our ultimate goal of delivering low cost, high-quality pigment to our coatings and other TiO_2 customers throughout the world. The mining, beneficiation and smelting of titanium bearing mineral sands creates meaningful quantities of zircon and pig iron, which we also supply to customers around the world.

We are a public limited company listed on the New York Stock Exchange and are registered under the laws of England and Wales.

Business Environment

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

Throughout the current COVID-19 pandemic, our operations have been designated as essential to support the continued manufacturing of products such as food and medical packaging, medical equipment, pharmaceuticals, and personal protective gear.

The fourth quarter of 2021 results were driven by robust demand across our end markets, with the supply to demand balance remaining tight due to below seasonally normal levels of TiO_2, production challenges caused by supplier force majeures and delivery times extended by shipping delays. Fourth quarter revenue increased 13% compared to the prior year, driven by higher TiO_2, Zircon and pig iron prices. On a year over year basis, TiO_2 average selling prices increased 17% on a local currency basis and 15% on a US dollar basis and Zircon average selling prices increased 26%. Both TiO_2 and Zircon sales volumes remained relatively flat in line with prior year levels. Revenue from feedstock and other products decreased 11% on a year over year basis due to the internal consumption of all feedstocks in the quarter compared to the prior year, partially offset by increased pig iron revenue from higher average selling prices. Sequentially, revenue increased 2% in the fourth quarter of 2021 compared to the third quarter of 2021, as price increases of TiO_2, Zircon and pig iron were partially offset by volume declines of TiO_2 and Zircon. TiO_2 average selling prices grew 3% sequentially on a US dollar basis and 4% on a local currency basis. TiO_2 volumes were

constrained by global logistics challenges and supply chain and certain raw material availability that resulted in a 4% sequential decline. Revenue from Zircon sales increased 3% sequentially, as a 9% increase in average selling prices due to improved pricing, was partially offset by 6% lower sales volumes. Feedstock and other product revenues increased 26% sequentially mainly due to both higher pig iron volumes and selling prices.

Gross profit decreased sequentially from the third quarter to the fourth quarter of 2021 due to lower sales volumes of TiO_2 and Zircon, higher production costs due to transitory inflation and increased freight rates, partially offset by favorable impacts of average selling prices. Gross profit increased year over year due to the increase in average selling prices of TiO_2, Zircon and pig iron and the favorable impact of sales volumes and product mix partially offset by unfavorable impacts of foreign currency as well as higher production costs and increased freight rates partially offset by favorable overhead absorption and cost savings.

As of December 31, 2021, our total available liquidity was $677 million, including $228 million in cash and cash equivalents and $449 million available under revolving credit agreements.

During the year ended December 31, 2021, we made several discretionary prepayments on our debt facilities primarily on the New Term Loan Facility and Standard Bank Term Loan Facility. During the fourth quarter of 2021, we made an additional $202 million of voluntary prepayments on our New Term Loan Facility. As of December 31, 2021, our total debt was $2.6 billion and net debt to trailing-twelve month Adjusted EBITDA was 2.5x. The Company also has no financial covenants on its term loan or bonds and only one springing financial covenant on its Cash Flow revolver facility, which we do not expect to be triggered based on our current scenario planning.

Consolidated Results of Operations from Continuing Operations

Year Ended December 31, 2021 Compared to the Year Ended December 31, 2020

	Reported Amounts		
	Year Ended December 31,		
	2021	2020	Variance
	(Millions of U.S. Dollars)		
Net sales	$ 3,572	$ 2,758	$ 814
Cost of goods sold	2,677	2,137	540
Gross profit	$ 895	$ 621	$ 274
Gross Margin	*25.1 %*	*22.5 %*	*2.6 pts*
Selling, general and administrative expenses	318	347	(29)
Restructuring	—	3	(3)
Income from operations	577	271	306
Interest expense	(157)	(189)	32
Interest income	7	8	(1)
Loss on extinguishment of debt	(65)	(2)	(63)
Other income, net	12	26	(14)
Income from continuing operations before income taxes	374	114	260
Income tax (provision) benefit	(71)	881	(952)
Net income from continuing operations	$ 303	$ 995	$ (692)
Effective tax rate	*19 %*	*(773)%*	*792 pts*
EBITDA[(1)]	$ 821	$ 599	$ 222
Adjusted EBITDA[(1)]	$ 947	$ 668	$ 279
Adjusted EBITDA as % of Net Sales	*26.5 %*	*24.2 %*	*2.3 pts*

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

Net sales of $3,572 million for the year ended December 31, 2021 increased by 30% compared to $2,758 million for the same period in 2020. Revenue increased primarily due to both higher TiO_2 and Zircon sales volumes and average selling prices. Net sales by type of product for the years ended December 31, 2021 and 2020 were as follows:

The table below presents reported revenue by product:

(Millions of dollars, except percentages)	Year Ended December 31, 2021	2020	Variance	Percentage
TiO_2	$ 2,793	$ 2,176	$ 617	28 %
Zircon	478	283	195	69 %
Feedstock and other products	301	299	2	1 %
Total net sales	$ 3,572	$ 2,758	$ 814	30 %

For the year ended December 31, 2021, TiO_2 revenue increased $617 million, or 28%, compared to the prior year due to a $369 million increase in sales volumes and an increase of $217 million in average selling prices. Foreign currency positively impacted TiO_2 revenue by $31 million due primarily to the strengthening of the Euro. Zircon revenues increased $195 million primarily due to a 55% increase in sales volumes and a 9% increase in average selling prices. Feedstock and other products revenue increased $2 million primarily due to an increase in average selling prices and sales volumes of pig iron partially offset by a decrease in sales volumes of CP slag and other feedstocks.

Gross profit of $895 million for the year ended December 31, 2021 was 25.1% of net sales compared to 22.5% of net sales for the same period in 2020. The increase in gross margin is primarily due to:

- the favorable impact of approximately 8 points due to an increase in TiO_2, Zircon and pig iron selling prices;
- the favorable impact of approximately 1 point for sales volume and product mix;
- the net unfavorable impact of approximately 4 points due to changes in foreign exchange rates, primarily due to the South African Rand and Australian dollar; and
- the net unfavorable impact of approximately 2 points due to higher production costs and increased freight rates offset by favorable overhead absorption and cost savings.

Selling, general and administrative ("SG&A") expenses decreased $29 million when comparing the year ended December 31, 2021 to the prior year. The SG&A expenses decrease was primarily driven by $29 million of lower professional fees and lower integration costs of $9 million, partially offset by $16 million of increased employee costs primarily driven by higher incentive compensation. The remaining net decrease was driven by individually immaterial amounts.

Income from operations for the year ended December 31, 2021 of $577 million, increased by $306 million or 113% compared to the same period in 2020 which is primarily attributable to the higher gross margin and lower selling, general and administrative expenses.

Adjusted EBITDA as a percentage of net sales was 26.5% for the year ended December 31, 2021, an increase of 2.3 points from 24.2% in the prior year. On a reported basis, the higher gross profit and lower SG&A expenses as discussed above were the primary drivers of the year-over-year increase in Adjusted EBITDA percentage.

Interest expense for the year ended December 31, 2021 decreased $32 million compared to the same period in 2020. The decrease is primarily due to the following: 1) lower average debt outstanding balances and lower average interest rates on the New Term Loan Facility as compared to the Prior Term Loan Facility, 2) lower average debt outstanding balance on the New Standard Bank Term Loan Facility as compared to the Prior Standard Bank Term Loan Facility, and 3) lower average interest rates on the Senior Notes due 2029 as compared to the Senior Notes due 2025 and the Senior Notes due 2026. These decreases in interest expense are partially offset by the four months of additional interest expense in the current year associated with the 6.5% Senior Secured Notes due 2025, which were issued on May 1, 2020.

Interest income for the year ended December 31, 2021 decreased by $1 million compared to the prior year primarily due to lower cash balances from the use of cash to paydown the New Term Loan Facility, the Standard Bank Term Loan Facility and the Tikon Loan.

Loss on extinguishment of debt of $65 million for the year ended December 31, 2021 is primarily comprised of the following: 1) call premiums paid of $21 million and $19 million in relation to the refinancing of our $615 million Senior Notes due 2026 and our $450 million Senior Notes due 2025, respectively, 2) the write-off of certain existing debt issuance costs and original issue discount as well as certain new lender and other third party fees associated with the refinancing of our new revolver

and term loan and issuance of our new senior notes due 2029 and 3) approximately $9 million write-off of existing debt issuance costs and original issue discount as a result of the $398 million voluntary prepayments made on the New Term Loan Facility.

Other income, net for the year ended December 31, 2021 primarily consisted of $16 million net realized and unrealized foreign currency gains, $8 million associated with the monthly technical service fee relating to the Jazan slagger we receive from AMIC, and $5 million of pension income primarily due to the expected return on plan assets offset by pension related interest costs and amortization of actuarial gain/losses partially offset by $18 million related to the breakage fee associated with the termination of the TTI acquisition. The foreign currency gains were primarily related to the South African Rand and the Australian dollar due to the remeasurement of our U.S. dollar denominated working capital and other long-term obligations partially offset by the impact of our foreign currency derivatives.

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

The effective tax rate was 19% and (773)% for the years ended December 31, 2021 and 2020, respectively. The large negative effective tax rate for the year ended December 31, 2020 is caused by the release of valuation allowances for deferred tax assets in the U.S. and Brazil, partially offset by the recording of valuation allowances in Saudi Arabia and the U.K. The net impact was $905 million benefit to the income tax provision. Refer to Note 8 of notes to consolidated financial statements for further information. Additionally, the effective tax rates for the years ended December 31, 2021 and 2020 are influenced by a variety of factors, primarily income and losses in jurisdictions with valuation allowances, disallowable expenditures, prior year accruals, and our jurisdictional mix of income at tax rates different than the U.K. statutory rate.

Year Ended December 31, 2020 Compared to the Year Ended December 31, 2019

A discussion of our results of operations for the year ended December 31, 2020 versus December 31, 2019 is included in Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations - Results of Operation”, included in our Annual Report on Form 10-K for the year ended December 31, 2020.

Other Comprehensive Income (Loss)

There was an other comprehensive loss of $104 million for the year ended December 31, 2021 compared to other comprehensive loss of $20 million for the year ended December 31, 2020. This increase in comprehensive loss was primarily driven by unfavorable movements of foreign currency translation adjustments of $113 million for the year ended December 31, 2021 as compared to unfavorable foreign currency translation adjustments of $4 million in the prior year. In addition, we recognized net losses on derivative instruments of $11 million in the year ended December 31, 2021 as compared to none in the prior year. These losses were partially offset by $20 million of pension and postretirement gains for the year ended December 31, 2021 as compared to $16 million of pension and postretirement losses for the prior year.

A discussion of our comprehensive (loss) income for the year ended December 31, 2020 versus December 31, 2019 is included in Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations - Other Comprehensive (Loss) Income”, included in our Annual Report on Form 10-K for the year ended December 31, 2020.

Liquidity and Capital Resources

During 2021, our liquidity decreased by $364 million to $677 million.

The table below presents our liquidity, including amounts available under our credit facilities, as of the following dates:

	December 31, 2021	December 31, 2020
Cash and cash equivalents	$ 228	$ 619
Available under the Wells Fargo Revolver	—	285
Available under the new Cash Flow Revolver	329	—
Available under the Standard Credit Facility	63	68
Available under the Emirates Revolver	38	50
Available under the SABB Facility	19	19
Total	$ 677	$ 1,041

Historically, we have funded our operations and met our commitments through cash generated by operations, issuance of unsecured notes, bank financings and borrowings under lines of credit. In the next twelve months, we expect that our operations will provide sufficient cash for our operating expenses, capital expenditures, interest payments and debt repayments, however, if necessary, we have the ability to borrow under our debt and revolving credit agreements (see Note 15 of notes to consolidated financial statements). This is predicated on our achieving our forecast which could be negatively impacted by items outside of our control, in particular, macroeconomic conditions including the economic impacts caused by continued impact of the COVID-19 pandemic. Consistent with our actions in 2020 in response to the COVID-19 pandemic, if negative events occur in the future, we may need to reduce our capital spend, cut back on operating costs, and other items within our control to maintain appropriate liquidity.

Working capital (calculated as current assets less current liabilities) was $1.2 billion at December 31, 2021, compared to $1.7 billion at December 31, 2020. The decrease year over year is primarily due to the decrease in cash as we made several voluntary prepayments on our debt obligations as is discussed below and in Note 15 of notes to consolidated financial statements and reductions in inventories as the supply / demand balance remains tight due to continued strong demand.

As of and for the year ended December 31, 2021, the non-guarantor subsidiaries of our 6.5% Senior Secured Notes and our Senior Notes due 2029 represented approximately 20% of our total consolidated liabilities, approximately 25% of our total consolidated assets, approximately 44% of our total consolidated net sales and approximately 49% of our Consolidated EBITDA (as such term is defined in 6.5% Senior Secured Notes Indenture and the 2029 Indenture). In addition, as of December 31, 2021, our non-guarantor subsidiaries had $777 million of total consolidated liabilities (including trade payables but excluding intercompany liabilities), all of which would have been structurally senior to the 6.5% Senior Secured Notes and the 2029 Notes. See Note 15 of notes to consolidated financial statements for additional information.

At December 31, 2021, we had outstanding letters of credit and bank guarantees of $53 million. See Note 15 of notes to consolidated financial statements.

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

As of December 31, 2021, our credit rating with Moody’s was B1 stable outlook unchanged from December 31, 2020. Starting in the first quarter of 2021 and through December 31, 2021, our credit rating with Standard & Poor's changed positively to B stable and further changed positively to Ba3 during the first quarter of 2022. See Note 15 of notes to consolidated financial statements.

Cash and Cash Equivalents

We consider all investments with original maturities of three months or less to be cash equivalents. As of December 31, 2021, our cash and cash equivalents were invested in money market funds and we also receive earnings credits for some balances left in our bank operating accounts. We maintain cash and cash equivalents in bank deposit and money market accounts that may exceed federally insured limits. The financial institutions where our cash and cash equivalents are held are highly rated and geographically dispersed, and we have a policy to limit the amount of credit exposure with any one institution. We have not experienced any losses in such accounts and believe we are not exposed to significant credit risk.

The use of our cash includes payment of our operating expenses, capital expenditures, servicing our interest and debt repayment obligations, making pension contributions and making quarterly dividend payments. On November 9, 2021, we updated our capital allocation policy and announced that our Board of Directors had authorized the repurchase of up to $300 million of the Company's ordinary shares through February 2024. Under the updated policy, the Board intends to increase the annual dividend to $0.50 per share beginning with the first quarterly dividend in 2022. We also expect to continue to invest in our businesses through cost reduction, as well as growth and vertical integration-related capital expenditures including projects such as newTRON and various mine development projects as well as continued reductions in our debt.

Repatriation of Cash

At December 31, 2021, we held $228 million in cash and cash equivalents in these respective jurisdictions: $5 million in the United States, $54 million in South Africa, $59 million in Australia, $30 million in Brazil, $40 million in Saudi Arabia, $19 million in China, and $21 million in Europe. Our credit facilities limit transfers of funds from subsidiaries in the United States to certain foreign subsidiaries. In addition, at December 31, 2021, we held $4 million of restricted cash of which $3 million is in Australia related to performance bonds and $1 million is in Saudi Arabia related to vendor supply agreement guarantees.

Tronox Holdings plc has foreign subsidiaries with undistributed earnings at December 31, 2021. We have made no provision for deferred taxes related to these undistributed earnings because they are considered indefinitely reinvested in the foreign jurisdictions.

Debt Obligations

In March 2021, the Company closed the refinancing of its existing first lien term loan credit agreement with a new seven-year first lien term loan credit facility (the "New Term Loan Facility") and existing revolving syndicated facility agreement with a new five-year cash flow revolving facility (the "New Revolving Facility"). Pursuant to the New Term Loan Facility, the Company's wholly owned subsidiary, Tronox Finance LLC borrowed $1,300 million of first lien term loans. Pursuant to the New Revolving Facility, the lenders thereunder have agreed to provide revolving commitments of $350 million. The Company also paid down approximately $313 million, with cash on hand, of debt in conjunction with the refinancing transaction. Refer to Note 15 of notes to consolidated financial statements for further details.

On March 15, 2021, Tronox Incorporated, a wholly-owned indirect subsidiary of the Company, issued its 4.625% senior notes due 2029 for an aggregate principal amount of $1,075 million. The net proceeds was used to fund the redemption in full on March 31, 2021 of the Company's outstanding $615 million aggregate principal amount of 6.50% senior notes due 2026 and the redemption in full on April 1, 2021 of Company’s outstanding $450 million aggregate principal amount of 5.75% senior notes due 2025. Refer to Note 15 of notes to consolidated financial statements for further details.

On October 1, 2021, Tronox Minerals Sands Proprietary Limited, a wholly-owned indirect subsidiary of the Company, entered into an amendment and restatement of a new credit facility with Standard Bank. The new credit facility provides the Company with (a) a new five-year term loan facility in an aggregate principal amount of R1.5 billion (approximately $98 million) (the "New Standard Bank Term Loan Facility") and (b) a new three-year revolving credit facility (the "New Standard Bank Revolving Credit Facility") providing initial revolving commitments of R1.0 billion (approximately $63 million at December 31, 2021 exchange rate). As a result of the amended facility, the Company repaid the remaining outstanding principal balance of R390 million (approximately $26 million) of the Standard Bank Term Loan Facility on September 30, 2021 and we drewdown the R1.5 billion (approximately $98 million) on the new term loan facility in November 2021.

During the year ended December 31, 2021, the Company made several voluntary prepayments totaling $398 million on the New Term Loan Facility. As a result of these voluntary prepayments, the Company recorded $9 million in "Loss on extinguishment of debt" within the Consolidated Statement of Operations for the year ended December 31, 2021.

During the year ended December 31, 2021, the Company made several voluntary prepayments totaling R1,040 million (approximately $69 million) on the Prior Standard Bank Term Loan Facility. Additionally, on September 30, 2021, in conjunction with the Company's refinancing of the Prior Standard Bank Term Loan Facility, the Company repaid the remaining outstanding principal balance of R390 million (approximately $26 million). During the year ended December 31, 2021, the Company repaid the remaining outstanding principal balance of CNY 111 million (approximately $17 million) on the Tikon loan. No prepayment penalties were required as a result of these principal prepayments.

On a consolidated basis, no incremental debt was incurred as a result of the aforementioned debt refinancing transactions.

At December 31, 2021 and 2020, our long-term debt, net of unamortized discount and debt issuance costs was $2.6 billion and $3.3 billion, respectively.

At December 31, 2021 and 2020, our net debt (the excess of our debt over cash and cash equivalents) was $2.3 billion and $2.7 billion, respectively. See Note 15 of notes to consolidated financial statements.

Cash Flows

Years Ended December 31, 2021 and 2020

The following table presents cash flow for the periods indicated:

	Year Ended December 31,	
	2021	2020
	(Millions of U.S. dollars)	
Net cash provided by operating activities	$ 740	$ 355
Net cash used in investing activities	(269)	(229)
Net cash (used in) provided by financing activities	(877)	214
Effect of exchange rate changes on cash	(10)	(3)
Net (decrease) increase in cash and cash equivalents	$ (416)	$ 337

Cash Flows provided by Operating Activities — Cash provided by our operating activities is driven by net income adjusted for non-cash items and changes in working capital items. The following table summarizes our net cash provided by operating activities for 2021 and 2020:

	Year Ended December 31,	
	2021	2020
	(Millions of U.S. dollars)	
Net income	$ 303	$ 995
Net adjustments to reconcile net income (loss) to net cash provided by operating activities	455	(488)
Income related cash generation	758	507
Net change in assets and liabilities	(18)	(152)
Net cash provided by our operating activities	$ 740	$ 355

Net cash provided by operating activities was $740 million in 2021 as compared to $355 million in 2020. The increase of $385 million period over period is primarily due to a $251 million improvement in net income net of non-cash adjustments and a decrease of $134 million use of cash for net assets and liabilities. The lower use of cash for working capital was primarily driven by decreases in inventories and prepaid and other current assets of $74 million and $82 million, respectively, and an increase in account payable and accrued liabilities of $36 million partially offset by an increase in accounts receivable of $59 million and an increased use of cash in long-term other assets and liabilities of $10 million.

Cash Flows used in Investing Activities — Net cash used in investing activities for the year ended December 31, 2021 was $269 million as compared to $229 million for the year ended December 31, 2020. The $40 million increase in use of cash year over year is primarily driven by higher capital expenditures of $272 million. The prior year also included $36 million for a loan to AMIC related to a titanium slag smelter facility (see Note 24 of notes to consolidated financial statements) of which there was no comparable amount in the current year.

Cash Flows (used in) provided by Financing Activities — Net cash used in financing activities during the year ended December 31, 2021 was $877 million as compared to cash provided by financing activities of $214 million for the year ended December 31, 2020. The current year is primarily comprised of repayments of long-term debt of $3 billion partially offset by proceeds from long-term debt of $2 billion due to the various debt refinancing transactions that occurred during the current year (refer to Note 15 of notes to consolidated financial statements) as well as the Company's continued focus on making discretionary debt repayments in order to achieve its previously stated gross debt target. As a result of the debt refinancing transactions, there was a $77 million use of cash for debt issuance costs and call premiums paid in 2021 as compared to $10 million in 2020. Additionally, dividends paid were $65 million during the year ended December 31, 2021 as compared to $40 million in the same period of 2020.

Years Ended December 31, 2020 and 2019

A discussion of our cash flows for the year ended December 31, 2020 versus 2019 is included in Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations - Cash Flows”, included in our Annual Report on Form 10-K for the year ended December 31, 2020.

Contractual Obligations

The following table sets forth information relating to our contractual obligations as of December 31, 2021:

		Contractual Obligation Payments Due by Period[3]			
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
		(Millions of U.S. dollars)			
Long-term debt and lease financing (including interest)[1]	$ 3,370	$ 151	$ 303	$ 757	$ 2,159
Purchase obligations[2]	655	231	209	157	58
Operating leases	226	34	42	29	121
Pension and other post-retirement benefit obligations[4]	312	37	65	64	146
Asset retirement obligations[5]	446	17	26	25	378
Total	**$ 5,009**	**$ 470**	**$ 645**	**$ 1,032**	**$ 2,862**

(1) We calculated the New Term Loan Facility interest at a LIBOR plus a margin of 2.25%. See Note 15 of notes to our consolidated financial statements.

(2) Includes obligations to purchase requirements of process chemicals, supplies, utilities and services. We have various purchase commitments for materials, supplies, and services entered into in the ordinary course of business. Included in the purchase commitments table above are contracts, which require minimum volume purchases that extend beyond one year or are renewable annually and have been renewed for 2022. Certain contracts allow for changes in minimum required purchase volumes in the event of a temporary or permanent shutdown of a facility. We believe that all of our purchase obligations will be utilized in our normal operations.

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

(4) Pension and other post-retirement benefit ("OPEB") obligations of $312 million include estimates of pension plan contributions and expected future benefit payments for unfunded pension and OPEB plans. Pension plan contributions are forecasted for 2022 only. Expected future unfunded pension and OPEB benefit payments are forecasted only through 2031. Contribution and unfunded benefit payment estimates are based upon current valuation assumptions. Estimates of pension contributions after 2022 and unfunded benefit payments after 2031 are not included in the table because the timing of their resolution cannot be estimated. Refer to Note 23 in notes to consolidated financial statements for further discussion on our pension and OPEB plans.

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

Non-U.S. GAAP Financial Measures

EBITDA and Adjusted EBITDA, which are used by management to measure performance, are not presented in accordance with U.S. GAAP. We define EBITDA as net income (loss) excluding the impact of income taxes, interest expense, interest income and depreciation, depletion and amortization. We define Adjusted EBITDA as EBITDA excluding the impact of nonrecurring items such as restructuring charges, gain or loss on debt extinguishments, impairment charges, gains or losses on sale of assets, acquisition-related transaction costs and pension settlements and curtailment gains or losses. Adjusted EBITDA also excludes non-cash items such as share-based compensation costs and pension and postretirement costs. Additionally, we exclude from Adjusted EBITDA, realized and unrealized foreign currency remeasurement gains and losses.

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

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

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

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

	Year Ended December 31,		
	2021	2020	2019
Net income (loss), (U.S. GAAP)	$ 303	$ 995	$ (97)
Income from discontinued operations, net of tax (see Note 6), (U.S. GAAP)	—	—	5
Net income (loss) from continuing operations, (U.S. GAAP)	303	995	(102)
Interest expense	157	189	201
Interest income	(7)	(8)	(18)
Income tax provision	71	(881)	14
Depreciation, depletion and amortization expense	297	304	280
EBITDA (non-U.S. GAAP)	821	599	375
Inventory step-up[a]	—	—	98
Contract loss[b]	—	—	19
Share-based compensation[c]	31	30	32
Transaction costs[d]	18	14	32
Restructuring[e]	—	3	22
Integration costs[f]	—	10	16
Loss on extinguishment of debt[g]	65	2	3
Foreign currency remeasurement[h]	(16)	(4)	(6)
Pension settlement and curtailment gains[i]	—	(2)	(1)
Costs associated with Exxaro deal[j]	6	—	4
Costs associated with former CEO retirement[k]	1	—	—
Gain on asset sale[l]	(2)	—	—
Office closure costs[m]	3	—	—
Insurance proceeds[n]	—	(11)	—
Other items[o]	20	27	21
Adjusted EBITDA (non-U.S. GAAP)	$ 947	$ 668	$ 615

(a) 2019 amount represents a pre-tax charge related to the recognition of a step-up in value of inventories as a result of purchase accounting.

(b) 2019 amount represents a pre-tax charge for the estimated losses we expect to incur under the supply agreement with Venator. See Note 3 of notes to consolidated financial statements.

(c) Represents non-cash share-based compensation. See Note 22 of notes to consolidated financial statements.

(d) 2021 amount represents the breakage fee and other costs associated with the termination of the TTI transaction which were primarily recorded in "Other income (expense)" in the Consolidated Statements of Operations. 2020 amount represents transaction costs associated with the TTI acquisition which were recorded in "Selling, general and administrative expenses" in the Consolidated Statement of Operations. 2019 amounts represent transaction costs associated with the Cristal Transaction which were recorded in “Selling, general and administrative expenses” in the Consolidated Statements of Operations.

(e) 2020 and 2019 amounts represent amounts for employee-related costs, including severance, which was recorded in “Restructuring” in the Consolidated Statements of Operations. See Note 4 of notes to consolidated financial statements.

(f) 2020 and 2019 amounts represent integration costs associated with the Cristal transaction after the acquisition which were recorded in "Selling, general and administrative expenses" in the Consolidated Statements of Operations.

(g) 2021 amount represents the loss in connection with the following: 1) termination of its Wells Fargo Revolver, 2) amendment and restatement of its term loan facility including the new revolving credit facility, 3) termination of its Senior Notes due 2026 and its Senior Notes due 2025, 4) issuance of its Senior Notes due 2029 and 5) several voluntary prepayments made on the New Term Loan Facility. See Note 15 of notes to consolidated financial statements. 2020 amount represents the loss in connection with a voluntary prepayment on the Prior Term Loan Facility. 2019 amount represents the loss in connection with the modification of the Wells Fargo Revolver and termination of the ABSA Revolver and a voluntary prepayment made on the Prior Term Loan Facility.

(h) Represents realized and unrealized gains and losses associated with foreign currency remeasurement related to third-party and intercompany receivables and liabilities denominated in a currency other than the functional currency of the entity holding them, which are included in "Other income (expense), net" in the Consolidated Statements of Operations.

(i) 2020 amount represents a curtailment gain due to the freezing of plan benefits partially offset by pension settlements. 2019 amount represents settlement gain related to the U.S. Pension Plan (acquired as part of the Cristal transaction).

(j) 2021 amount represents costs associated with the Exxaro flip-in transaction which are included in "Selling, general and administrative expenses" in the Consolidated Statements of Operations. 2019 amount represents the payment to Exxaro for capital gains tax on the disposal of its ordinary shares in Tronox Holdings plc included in "Other income (expense), net" in the Consolidated Statements of Operations.

(k) 2021 amount represents costs, excluding share-based compensation, associated with the retirement agreement of the former CEO which were recorded in "Selling, general and administrative expenses" in the Consolidated Statements of Operations. The $2 million of share based compensation expense associated with the former CEO is included in the total share-based compensation amounts of $31 million in the table above.

(l) 2021 amount represents the gain on European Union carbon credits sold in March 2021 which were recorded in "Cost of goods sold" in the Consolidated Statement of Operations.

(m) Represents impairments of our right-of-use assets associated with the early termination of our leases and other costs related to the closure of our Baltimore and New York City offices which are included in "Selling, general and administrative expenses" in the Consolidated Statements of Operations.

(n) 2020 amount represents reimbursement from claims related to the Ginkgo concentrator failure we inherited as a part of the Cristal transaction.

(o) Includes noncash pension and postretirement costs, accretion expense, severance expense, and other items included in “Selling general and administrative expenses” and “Cost of goods sold” in the Consolidated Statements of Operations.

Critical Accounting Policies and Estimates

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

Asset Retirement Obligations

To the extent a legal obligation exists, an asset retirement obligation (“ARO”) is recorded at its estimated fair value and accretion expense is recognized over time as the discounted liability is accreted to its expected settlement value. Because AROs represent financial obligations to be settled in the future, uncertainties exist in estimating the timing and amount of the associated costs to be incurred. Fair value is measured using expected future cash outflows, adjusted for expected inflation and discounted at our credit-adjusted risk-free interest rate. No market-risk premium has been included in our calculation of ARO balances since we can make no reliable estimate. Management believes these estimates and assumptions are reasonable; however, they are inherently uncertain. Refer to Notes 19 to the consolidated financial statements for a summary of the estimates and assumptions utilized. At December 31, 2021, AROs were $149 million of which the long-term portion of $139 million is recorded in "Asset retirement obligations" and the short-term portion of $10 million is recorded in "Accrued liabilities" in the Consolidated Balance Sheet.

Environmental Matters

Liabilities for environmental matters are recognized when remedial efforts are probable and the costs can be reasonably estimated. Such liabilities are based on our best estimate of the undiscounted future costs required to complete the remedial work. The recorded liabilities are adjusted periodically as remediation efforts progress or as additional technical, regulatory or legal information becomes available. Given the uncertainties regarding the status of laws, regulations, enforcement policies, the impact of other potentially responsible parties, technology and information related to individual sites, we do not believe it is possible to develop an estimate of the range or reasonably possible environmental loss in excess of our recorded liabilities. At December 31, 2021, environmental liabilities (both short term and long term) were $72 million, primarily related to the Cristal transaction.

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

Income Taxes

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

Deferred tax assets and liabilities are determined based on temporary differences between the financial reporting and tax bases of assets and liabilities using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. A valuation allowance is provided against a deferred tax asset when it is more

likely than not that all or some portion of the deferred tax asset will not be realized. We periodically assess the likelihood that we will be able to recover our deferred tax assets and reflect any changes in our estimates in the valuation allowance with a corresponding adjustment to earnings or other comprehensive income (loss) as appropriate. ASC 740, *Income Taxes*, requires that all available positive and negative evidence be weighted to determine whether a valuation allowance should be recorded.

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

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

Contingencies

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

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

Long-Lived Assets

Key estimates related to long-lived assets (property, plant and equipment, mineral leaseholds, and intangible assets) include useful lives, recoverability of carrying values, and the existence of any asset retirement obligations. As a result of future decisions, such estimates could be significantly modified. The estimated useful lives of property, plant and equipment range from three to forty years, and depreciation is recognized on a straight-line basis. Useful lives are estimated based upon our historical experience, engineering estimates, and industry information. These estimates include an assumption regarding periodic maintenance. Mineral leaseholds are depreciated over their useful lives as determined under the units of production method. Intangible assets with finite useful lives are amortized on the straight-line basis over their estimated useful lives. The amortization methods and remaining useful lives are reviewed quarterly.

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

Pension and Postretirement Benefits

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

retirement, mortality, and turnover. Refer to Notes 2 and 23 to the consolidated financial statements for a summary of the plan assumptions and additional information on our pension arrangements.

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

Discount Rate — The discount rates selected for estimation of the actuarial present value of the benefit obligations are determined based on the prevailing market rate for high-quality, fixed-income debt instruments with maturities corresponding to the expected timing of benefit payments as of the annual measurement date for each of the various plans. These rates change from year to year based on market conditions that affect corporate bond yields. A 100 basis points change in discount rates, with all other variables held constant, would decrease/increase our pension expense by approximately $1 million. A 100 basis points reduction in discount rates would increase the PBO by approximately $72 million whereas a 100 basis point increase in discount rates would have a favorable impact to the PBO of approximately $61 million.

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

Recent Accounting Pronouncements

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

Environmental Matters

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

Refer to Item 3. Legal Proceedings for further information.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

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

Market Risk

A substantial portion of our products and raw materials are commodities that reprice as market supply and demand fundamentals change. Accordingly, product margins and the level of our profitability tend to vary with changes in the business cycle. Our TiO_2 prices may do so in the near term as ore prices and pigment prices are expected to fluctuate over the next few years. We try to protect against such instability through various business strategies. These include provisions in sales contracts allowing us to pass on higher raw material costs through timely price increases and formula price contracts to transfer or share

commodity price risk, as well as using varying contract term lengths and selling to a diverse mix of customers by geography and industry to reap the benefits of a diverse portfolio.

Credit Risk

Credit risk is the risk that a borrower or a counterparty will fail to meet their obligations. A significant portion of our liquidity is concentrated in trade accounts receivable that arise from sales of our products to customers. In the case of TiO_2, the high level of industry concentration has the potential to impact our overall exposure to credit risk, either positively or negatively, in that our customers may be similarly affected by changes in economic, industry or other conditions. We have significant exposure to credit risk in industries that are affected by cyclical economic fluctuations. We perform ongoing credit evaluations of our customers from time to time, as deemed appropriate, to mitigate credit risk but generally do not require collateral. Our contracts typically enable us to tighten credit terms if we perceive additional credit risk; however, historic losses due to write offs of bad debt have been relatively low. In addition, due to our international operations, we are subject to potential trade restrictions and sovereign risk in certain countries in which we operate. We maintain allowances for potential credit losses based on specific customer review and current financial conditions. During 2021, 2020 and 2019 our ten largest third-party customers represented 28%, 32%, and 31%, respectively, of our consolidated net sales. During 2021, 2020, and 2019, no single customer accounted for 10% of our consolidated net sales.

Interest Rate Risk

Interest rate risk arises from the possibility that changes in interest rates will impact our financial results. We are exposed to interest rate risk on our floating rate debt, the New Term Loan Facility, Standard Bank Term Loan Facility, new Cash Flow Revolver, Standard Bank Revolver, Emirates Revolver and SABB Credit Facility balances. Using a sensitivity analysis as of December 31, 2021, a hypothetical 1% increase in interest rates would result in a net decrease to pre-tax income of approximately $2 million on an annualized basis. This is due to the fact that earnings on our interest earning financial assets of $45 million at December 31, 2021 would increase by the full 1%, offsetting the impact of a 1% increase in interest expense on our floating rate debt of $277 million.

During 2019, we entered into interest-rate swap agreements for a portion of our Prior Term Loan Facility, which effectively convert the variable rate to a fixed rate for a portion of the loan. The agreements expire in September 2024. The Company's objectives in using the interest-rate swap agreements are to add stability to interest expense and to manage its exposure to interest rate movements. There was no impact associated with the New Term Loan Facility as the hedge remained highly effective.

Currency Risk

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

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

As of December 31, 2021, we had notional amounts of 443 million Australian dollars (approximately $322 million at December 31, 2021 exchange rate) that expire between January 25, 2022 and December 23, 2022 to reduce the exposure of our Australian subsidiaries' cost of sales to fluctuations in currency rates. At December 31, 2021, we had notional amounts of 4.7 billion South African Rand (approximately $298 million at December 31, 2021 exchange rate) that expire between January 26, 2022 and December 28, 2022 to reduce the exposure of our South African subsidiaries' third party sales to fluctuations in currency

rates. At December 31, 2021 and December 31, 2020, there was an unrealized net gain of $15 million and an unrealized net gain of $58 million, respectively, recorded in "Accumulated other comprehensive loss" on the Consolidated Balance Sheet.

From time to time, we enter into foreign currency contracts to reduce exposure of our subsidiaries' balance sheet accounts not denominated in our subsidiaries' functional currency to fluctuations in foreign currency exchange rates. For accounting purposes, these foreign currency contracts are not considered hedges. The change in fair value associated with these contracts is recorded in "Other income (expense), net" within the Consolidated Statement of Operations and partially offsets the change in value of third party and intercompany-related receivables not denominated in the functional currency of the subsidiary. At December 31, 2021, there was (i) 510 million South African Rand (or approximately $32 million at December 31, 2021 exchange rate) and (ii) 172 million Australian dollars (or approximately $125 million at December 31, 2021 exchange rate) of notional amount of outstanding foreign currency contracts. At December 31, 2021, the fair value of the foreign currency contracts was a gain of $1 million.

Item 8. Financial Statements and Supplementary Data

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Tronox Holdings plc

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Tronox Holdings plc and its subsidiaries (the "Company") as of December 31, 2021 and 2020, and the related consolidated statements of operations, of comprehensive income (loss), of shareholders' equity and of cash flows for each of the three years in the period ended December 31, 2021, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2021, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

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

Basis for Opinions

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

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

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

Definition and Limitations of Internal Control over Financial Reporting

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

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

Critical Audit Matters

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

Valuation Allowance Assessment of Deferred Tax Assets

As described in Notes 2 and 8 to the consolidated financial statements, the Company has recorded $1.1 billion of deferred tax assets as of December 31, 2021, net of valuation allowances of $1.7 billion. Deferred tax assets and liabilities are determined based on temporary differences between the financial reporting and tax bases of assets and liabilities using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. A valuation allowance is provided against a deferred tax asset when it is more likely than not that all or some portion of the deferred tax asset will not be realized. The Company periodically assesses the likelihood that they will be able to recover the deferred tax assets and reflect any changes in estimates of the valuation allowance, with a corresponding adjustment to earnings or other comprehensive income (loss), as appropriate. All available positive and negative evidence is weighted to determine whether a valuation allowance should be recorded.

The principal considerations for our determination that performing procedures relating to the valuation allowance assessment of deferred tax assets is a critical audit matter are the significant judgment by management in determining the realizability of deferred tax assets by jurisdiction, particularly as it relates to the assessment of cumulative tax losses, estimates of future taxable income and assessment of factors that may limit the realizability of certain deferred tax assets. This in turn led to a high degree of auditor judgment, subjectivity, and effort in performing procedures and in evaluating audit evidence relating to management's assessment of cumulative tax losses, estimates of future taxable income and assessment of factors that may limit the realizability of certain deferred tax assets.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the valuation allowance assessment of deferred tax assets, including controls over the determination of cumulative tax losses, estimates of future taxable income and assessment of factors that may limit the realizability of certain deferred tax assets. These procedures also included, among others, testing the completeness and accuracy of underlying data used by management, and evaluating management's assessment of the realizability of deferred tax assets by jurisdiction. This included evaluating the reasonableness of management's assumptions related to the assessment of cumulative tax losses, estimates of future taxable income and assessment of factors that may limit the realizability of certain deferred tax assets. Evaluating management's assumptions related to the assessment of cumulative tax losses, estimates of future taxable income and assessment of factors that may limit the realizability of certain deferred tax assets involved evaluating whether the assumptions used by management were reasonable considering the current and past performance of the respective entity and whether the assumptions were consistent with evidence obtained in other areas of the audit.

/s/ PricewaterhouseCoopers LLP
Stamford, Connecticut
February 22, 2022

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

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

	Year Ended December 31,		
	2021	**2020**	**2019**
Net sales	$ 3,572	$ 2,758	$ 2,642
Cost of goods sold	2,677	2,137	2,159
Contract loss	—	—	19
Gross profit	895	621	464
Selling, general and administrative expenses	318	347	347
Restructuring	—	3	22
Income from operations	577	271	95
Interest expense	(157)	(189)	(201)
Interest income	7	8	18
Loss on extinguishment of debt	(65)	(2)	(3)
Other income, net	12	26	3
Income (loss) from continuing operations before income taxes	374	114	(88)
Income tax (provision) benefit	(71)	881	(14)
Net income (loss) from continuing operations	303	995	(102)
Net income from discontinued operations, net of tax	—	—	5
Net income (loss)	303	995	(97)
Net income attributable to noncontrolling interest	17	26	12
Net income (loss) attributable to Tronox Holdings plc	$ 286	$ 969	$ (109)
Net income (loss) per share, basic:			
Continuing operations	$ 1.88	$ 6.76	$ (0.81)
Discontinued operations	$ —	$ —	$ 0.03
Net income (loss) per share, basic	$ 1.88	$ 6.76	$ (0.78)
Net income (loss) per share, diluted:			
Continuing operations	$ 1.81	$ 6.69	$ (0.81)
Discontinued operations	$ —	$ —	$ 0.03
Net income (loss) per share, diluted	$ 1.81	$ 6.69	$ (0.78)
Weighted average shares outstanding, basic (in thousands)	152,056	143,355	139,859
Weighted average shares outstanding, diluted (in thousands)	157,945	144,906	139,859

See notes to consolidated financial statements.

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

	Year Ended December 31,		
	2021	2020	2019
Net income (loss)	$ 303	$ 995	$ (97)
Other comprehensive income (loss):			
Foreign currency translation adjustments	(113)	(4)	19
Pension and postretirement plans (See Note 23):			
Actuarial gains (losses), net of taxes of $6, $5 and $1 in 2021, 2020 and 2019, respectively	16	(20)	(11)
Amortization of unrecognized actuarial losses, net of taxes of $2 in 2021, and less than $1 in both 2020 and 2019	4	4	2
Total pension and postretirement gains (losses)	20	(16)	(9)
Realized (gains) losses on derivative instruments reclassified from accumulated other comprehensive loss to the Consolidated Statements of Operations	(32)	4	(7)
Unrealized gains (losses) on derivative financial instruments, (net of taxes of less than $1, $5 and $5 in 2021, 2020, 2019, respectively; See Note 16)	21	(4)	8
Other comprehensive (loss) income	(104)	(20)	11
Total comprehensive income (loss)	$ 199	$ 975	$ (86)
Comprehensive income (loss) attributable to noncontrolling interest:			
Net income	17	26	12
Foreign currency translation adjustments	(10)	(16)	16
Comprehensive income attributable to noncontrolling interest	7	10	28
Comprehensive income (loss) attributable to Tronox Holdings plc	$ 192	$ 965	$ (114)

See notes to consolidated financial statements.

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

	December 31,	
	2021	2020
ASSETS		
Current Assets		
Cash and cash equivalents	$ 228	$ 619
Restricted cash	4	29
Accounts receivable (net of allowance of $4 in 2021 and $5 in 2020)	631	540
Inventories, net	1,048	1,137
Prepaid and other assets	132	200
Income taxes receivable	6	4
Total current assets	2,049	2,529
Noncurrent Assets		
Property, plant and equipment, net	1,710	1,759
Mineral leaseholds, net	747	803
Intangible assets, net	217	201
Lease right of use assets, net	85	81
Deferred tax assets	985	1,020
Other long-term assets	194	175
Total assets	$ 5,987	$ 6,568
LIABILITIES AND EQUITY		
Current Liabilities		
Accounts payable	$ 438	$ 356
Accrued liabilities	328	350
Short-term lease liabilities	26	39
Long-term debt due within one year	18	58
Income taxes payable	12	2
Total current liabilities	822	805
Noncurrent Liabilities		
Long-term debt, net	2,558	3,263
Pension and postretirement healthcare benefits	116	146
Asset retirement obligations	139	157
Environmental liabilities	66	67
Long-term lease liabilities	55	41
Deferred tax liabilities	157	176
Other long-term liabilities	32	42
Total liabilities	3,945	4,697
Commitments and Contingencies - Note 20		
Shareholders' Equity		
Tronox Holdings plc ordinary shares, par value $0.01 — 153,934,677 shares issued and outstanding at December 31, 2021 and 143,557,479 shares issued and outstanding at December 31, 2020	2	1
Capital in excess of par value	2,067	1,873
Retained Earnings	663	434
Accumulated other comprehensive loss	(738)	(610)
Total Tronox Holdings plc shareholders' equity	1,994	1,698
Noncontrolling interest	48	173
Total equity	2,042	1,871
Total liabilities and equity	$ 5,987	$ 6,568

See notes to consolidated financial statements.

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

	Year Ended December 31,		
	2021	**2020**	**2019**
Cash Flows from Operating Activities:			
Net income (loss)	$ 303	$ 995	$ (97)
Net income from discontinued operations, net of tax	—	—	5
Net income (loss) from continuing operations	303	995	(102)
Adjustments to reconcile net income (loss) from continuing operations to net cash provided by operating activities, continuing operations:			
Depreciation, depletion and amortization	297	304	280
Deferred income taxes	15	(899)	(9)
Share-based compensation expense	31	30	32
Amortization of deferred debt issuance costs and discount on debt	11	10	8
Loss on extinguishment of debt	65	2	3
Contract loss	—	—	19
Acquired inventory step-up recognized in earnings	—	—	98
Other non-cash affecting net income (loss)	36	65	25
Changes in assets and liabilities:			
(Increase) decrease in accounts receivable, net	(108)	(49)	78
Decrease (increase) in inventories, net	53	(21)	(59)
Decrease (increase) in prepaid and other assets	53	(29)	20
Increase in accounts payable and accrued liabilities	53	17	67
Net changes in income tax payables and receivables	9	(2)	(13)
Changes in other non-current assets and liabilities	(78)	(68)	(35)
Cash provided by operating activities – continuing operations	740	355	412
Cash Flows from Investing Activities:			
Capital expenditures	(272)	(195)	(198)
Cristal Acquisition	—	—	(1,675)
Proceeds from sale of Ashtabula	—	—	701
Insurance proceeds	1	1	10
Loans	—	(36)	(25)
Proceeds from the sale of assets	2	1	2
Cash used in investing activities – continuing operations	(269)	(229)	(1,185)
Cash Flows from Financing Activities:			
Repayments of short-term debt	—	(13)	—
Repayments of long-term debt	(3,212)	(233)	(387)
Proceeds from short-term debt	—	13	—
Proceeds from long-term debt	2,472	500	222
Repurchase of common stock	—	—	(288)
Acquisition of noncontrolling interest	—	—	(148)
Debt issuance costs	(37)	(10)	(4)
Call premium paid	(40)	—	—
Dividends paid	(65)	(40)	(27)
Restricted stock and performance-based shares settled in cash for taxes	(3)	(3)	(6)
Proceeds from the exercise of stock options	8	—	—
Cash (used in) provided by financing activities – continuing operations	(877)	214	(638)
Discontinued Operations:			
Cash provided by operating activities	—	—	29
Cash used in investing activities	—	—	(1)
Net cash flows provided by discontinued operations	—	—	28
Effects of exchange rate changes on cash and cash equivalents and restricted cash	(10)	(3)	(2)
Net (decrease) increase in cash and cash equivalents and restricted cash	(416)	337	(1,385)
Cash and cash equivalents and restricted cash at beginning of period	648	311	1,696
Cash and cash equivalents and restricted cash at end of period - continuing operations	$ 232	$ 648	$ 311

Supplemental cash flow information - continuing operations:			
Interest paid, net	$ 138	$ 159	$ 188
Income taxes paid	$ 47	$ 17	$ 34

See notes to consolidated financial statements.

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

	Tronox Holdings plc Ordinary Shares (in thousands)	Tronox Holdings plc Ordinary Shares (amount)	Capital in Excess of par Value	(Accumulated Deficit) Retained Earnings	Accumulated Other Comprehensive Loss	Total Tronox Limited Shareholders' Equity	Non-controlling Interest	Total Equity
Balance at January 1, 2019	122,934	$ 1	$ 1,579	$ (357)	$ (540)	$ 683	$ 179	$ 862
Net (loss) income	—	—	—	(109)	—	(109)	12	(97)
Other comprehensive (loss) income	—	—	—	—	(5)	(5)	16	11
Shares-based compensation	3,347	—	32	—	—	32	—	32
Shares issued for acquisition	37,580	—	526	—	—	526	—	526
Shares repurchased and cancelled	(21,453)	—	(288)	—	—	(288)	—	(288)
Shares cancelled	(508)	—	(6)	—	—	(6)	—	(6)
Acquisition of noncontrolling interest	—	—	3	—	(61)	(58)	(90)	(148)
Cristal acquisition	—	—	—	—	—	—	51	51
Ordinary share dividends ($0.18 per share)	—	—	—	(27)	—	(27)	—	(27)
Balance at December 31, 2019	141,900	$ 1	$ 1,846	$ (493)	$ (606)	$ 748	$ 168	$ 916
Net income	—	—	—	969	—	969	26	995
Other comprehensive loss	—	—	—	—	(4)	(4)	(16)	(20)
Shares-based compensation	2,032	—	30	—	—	30	—	30
Shares cancelled	(375)	—	(3)	—	—	(3)	—	(3)
Measurement period adjustment related to Cristal acquisition	—	—	—	—	—	—	(3)	(3)
Minority interest dividend	—	—	—	—	—	—	(2)	(2)
Ordinary share dividends ($0.28 per share)	—	—	—	(42)	—	(42)	—	(42)
Balance at December 31, 2020	143,557	$ 1	$ 1,873	$ 434	$ (610)	$ 1,698	$ 173	$ 1,871
Net income	—	—	—	286	—	286	17	303
Other comprehensive loss	—	—	—	—	(94)	(94)	(10)	(104)
Shares-based compensation	2,844	—	31	—	—	31	—	31
Shares cancelled	(137)	—	(3)	—	—	(3)	—	(3)
Options exercised	425	—	8	—	—	8	—	8
Acquisition of noncontrolling interest	7,246	1	158	—	(34)	125	(125)	—

Ordinary share dividends ($0.36 per share)	—	—	—	(57)	—	(57)	(7)	(64)
Balance at December 31, 2021	153,935	$ 2	$ 2,067	$ 663	$ (738)	$ 1,994	$ 48	$ 2,042

See notes to consolidated financial statements.

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

1. The Company

Tronox Holdings plc (referred to herein as "Tronox", the "Company", "we", "us", or "our") operates titanium-bearing mineral sand mines and beneficiation operations in Australia, South Africa and Brazil to produce feedstock materials that can be processed into TiO_2 for pigment, high purity titanium chemicals, including titanium tetrachloride, and Ultrafine© titanium dioxide used in certain specialty applications. It is our long-term strategic goal to be vertically integrated and consume all of our feedstock materials in our own nine TiO_2 pigment facilities which we operate in the United States, Australia, Brazil, UK, France, the Netherlands, China and the Kingdom of Saudi Arabia ("KSA"). We believe that vertical integration is the best way to achieve our ultimate goal of delivering low cost, high-quality pigment to our coatings and other TiO_2 customers throughout the world. The mining, beneficiation and smelting of titanium bearing mineral sands creates meaningful quantities of zircon and pig iron, which we also supply to customers around the world.

We are a public limited company listed on the New York Stock Exchange and are registered under the laws of England and Wales.

Basis of Presentation

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

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

Use of Estimates

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

2. Significant Accounting Policies

Foreign Currency

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

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

Revenue Recognition

We recognize revenue at a point in time when the customer obtains control of the promised products. For most transactions this occurs when products are shipped from our manufacturing facilities or at a later point when control of the products transfers to the customer at a specified destination or time. All amounts billed to a customer in a sales transaction related to shipping and handling represent revenues earned and are reported as "Net sales" in the Consolidated Statements of Operations. Accruals are made for sales returns, rebates and other allowances, which are recorded in "Net sales" in the Consolidated Statements of Operations and are based on our historical experience and current business conditions. Additionally, we have elected the practical

expedient to exclude sales taxes and similar taxes that we collect from customers on behalf of government authorities from the revenue transaction price. See Note 5.

Cost of Goods Sold

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

Research and Development

Research and development costs, included in "Selling, general and administrative expenses" in the Consolidated Statements of Operations comprised of salaries, building costs, utilities, administrative expenses, third party research, and allocations of corporate costs, were $13 million, $12 million, and $17 million during 2021, 2020, and 2019, respectively, and were expensed as incurred.

Selling, General and Administrative Expenses

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

Income Taxes

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

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

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

Earnings per Share

Basic and diluted earnings per share are calculated using the two-class method. Under the two-class method, earnings used to determine basic earnings per share are reduced by an amount allocated to participating securities. Participating securities include restricted shares issued under the Tronox Management Equity Incentive Plan (the "MEIP") (see Note 22), which contains non-forfeitable dividend rights. Our unexercised options and unvested restricted share units do not contain non-forfeitable rights to dividends and, as such, are not considered in the calculation of basic earnings per share. Our unvested restricted shares do not have a contractual obligation to share in losses; therefore, when we record a net loss, none of the loss is allocated to participating securities. Consequently, in periods of net loss, the two-class method does not have an effect on basic loss per share.

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

Fair Value Measurement

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

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

See Note 17.

Cash and Cash Equivalents

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

At December 31, 2021, we had restricted cash of $4 million comprised of $3 million in Australia related to outstanding performance bonds and $1 million in Saudi Arabia related to vendor supply agreement guarantees. At December 31, 2020, we had restricted cash of $29 million comprised of $18 million in Europe related to the termination fee associated with the TTI acquisition, $10 million in Australia related to outstanding performance bonds and $1 million in Saudi Arabia related to vendor supply agreement guarantees.

Accounts Receivable, net of allowance for credit losses

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

Inventories, net

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

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

Long Lived Assets

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

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

Maintenance and repairs are expensed as incurred, except for costs of replacements or renewals that improve or extend the lives of existing properties, which are capitalized. Upon retirement or sale, the cost and related accumulated depreciation are

removed from the respective account, and any resulting gain or loss is included in “Cost of goods sold” or “Selling, general, and administrative expenses” in the Consolidated Statements of Operations. See Note 11.

We capitalize costs associated with our asset retirement obligations which are generally included in machinery and equipment. See Note 19.

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

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

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

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

Business Acquisitions

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

Leases

We determine if a contract is or contains a lease at inception of the contract. Our leases are primarily operating leases. Leased assets primarily include office buildings, rail cars and motor vehicles, forklifts, and other machinery and equipment. Our leases primarily have fixed lease payments, with real estate leases typically requiring additional payments for real estate taxes and occupancy-related costs. Certain of our leases also have variable lease payments. Variable lease payments that depend on an index or a rate (such as the Consumer Price Index) are included in our initial measurement of the lease right of use assets and lease liabilities. Variable lease payments that are not index or rate based (such as variable payments based on our performance or use of the leased assets) are recorded as expenses when incurred and excluded from the measurement of right of use assets and lease liabilities. Our leases typically have initial lease terms ranging from 1 to 25 years. Some of our lease agreements include options to renew, extend or early terminate the leases. Lease term is the non-cancellable period of a lease, adjusted by the period covered by an option to extend or terminate the lease if we are reasonably certain to exercise (or not exercise) that option. Our operating leases typically do not contain purchase options we expect to exercise, residual value guarantees or other material covenants.

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

Long-term Debt

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

Asset Retirement Obligations

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

Environmental Remediation and Other Contingencies

We record an undiscounted liability when any of the following occur: 1) a claim or assessment has been asserted, 2) a litigation has commenced, or 3) based on available information, it is probable that a claim or an assessment will be asserted or a litigation will commence; and in addition, the outcome is expected to be unfavorable to us and the associated costs can be reasonably estimated. See Note 20.

Self-Insurance

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

Share-based Compensation

Equity Restricted Share and Restricted Share Unit Awards — The fair value of equity instruments is measured based on the share price on the grant date and is recognized over the vesting period. These awards contain service, market, and/or performance conditions. For awards containing only a service or a market condition, we have elected to recognize compensation costs using the straight-line method over the requisite service period for the entire award. For awards containing a market condition, the fair value of the award is measured using the Monte Carlo simulation under a lattice model approach. For awards containing a performance condition, the fair value is the grant date close price and compensation expense is not recognized until we conclude that it is probable that the performance condition will be met. We reassess the probability at least quarterly. See Note 22.

Defined Benefit Pension and Postretirement Benefit Plans

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

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

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

selling, general and administrative expenses in the Consolidated Statement of Operations based on the employees' respective functions.

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

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

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

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

Recently Adopted Accounting Pronouncements

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

Recently Issued Accounting Pronouncements

In March 2020, the FASB issued ASU 2020-04, "Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform Financial Reporting". This amendment is elective in nature. Amongst other aspects, this standard provides for practical expedients and exceptions to current accounting standards that reference a rate which is expected to be dissolved (e.g., London Interbank Offered Rate "LIBOR") as it relates to hedge accounting, contract modifications and other transactions that reference this rate, subject to meeting certain criteria. The standard is effective for all entities as of March 12, 2020 through December 31, 2022. The Company is currently evaluating the impact of the standard.

3. **Acquisitions and Related Divestitures**

TTI Acquisition

In May 2020, the Company announced that it had signed a definitive agreement to acquire the Tizir Titanium and Iron ("TTI") business from Eramet S.A. for approximately $300 million in cash, plus 3% per annum which accrues for the period from January 1, 2020 until the transaction closes. TTI is a titanium smelter located in Tyssedal, Norway which upgrades ilmenite to produce high-grade titanium slag and high-purity pig iron with an annual capacity of approximately 230,000 tons and 90,000 tons, respectively.

Pursuant to the definitive agreement, we were required to pay to Eramet S.A. a termination fee of $18 million if the agreement is terminated as a result of a failure to satisfy certain regulatory approvals prior to May 13, 2021. During the second quarter of 2020, upon signing of the definitive agreement to acquire TTI, we placed $18 million into an escrow account with a third-party financial institution.

One of the conditions to the transaction was the obtaining of certain regulatory approvals that would include UK Competition and Markets Authority ("CMA") approval by no later than a date specified in the definitive agreement (the "Condition Satisfaction Date"). On January 4, 2021, the Company received a decision from the CMA indicating that it intended to open a Phase 2 investigation into the Company's proposed acquisition of TTI. In response to the concerns presented by the CMA, the Company submitted a remedy proposal, which the CMA rejected on January 18, 2021. As a result of this rejection, the Company concluded that it is not possible to complete the transaction by the Condition Satisfaction Date and elected to terminate the transaction. On January 19, 2021, pursuant to the definitive agreement the $18 million previously placed into escrow was released

to Eramet in satisfaction of the termination fee, which was recorded in "Other income, net" in our Consolidated Statement of Operations. At December 31, 2020, the $18 million is reflected within "Restricted cash" on the Consolidated Balance Sheet.

Cristal Acquisitions and Related Divestitures

On April 10, 2019, we completed the acquisition of the TiO_2 business of Cristal for $1.675 billion of cash, plus 37,580,000 ordinary shares. The total acquisition price, including the value of the ordinary shares at $14 per share on the closing date of the Cristal Transaction, was approximately $2.2 billion. With the acquisition of our shares, an affiliate of Cristal became our largest shareholder. At December 31, 2021, Cristal International Holdings B.V. (formerly known as Cristal Inorganic Chemical Netherlands Cooperatief W.A.), a wholly-owned subsidiary of The National Titanium Dioxide Company Limited., continues to own 37,580,000 shares of Tronox, or a 24% ownership interest. The National Titanium Dioxide Company Limited is 79% owned by Tasnee.

In order to obtain regulatory approval for the Cristal Transaction, the FTC required us to divest Cristal's North American TiO_2 business, which we sold to INEOS on May 1, 2019, for cash proceeds, net of transaction costs, of $701 million, inclusive of an amount for a working capital adjustment. The operating results of Cristal's North American TiO_2 business from the acquisition date to the date of divestiture are included in a single caption entitled "Net Income (Loss) from discontinued operations, net of tax" in our Consolidated Statements of Operations. See Note 6 for further information on discontinued operations.

In conjunction with the Cristal Transaction, we entered into a transition services agreement with Tasnee and certain of its affiliates under which we and the Tasnee entities will provide certain transition services to one another. See Note 24 for further details of the transition services agreement. In conjunction with the divestiture of Cristal's North American TiO_2 business to INEOS, we entered into a two-year transition services agreement with INEOS. Under the terms of the transition services agreement, INEOS agreed to provide services to Tronox for manufacturing, technology and innovation, information technology, finance, warehousing and human resources. Similarly, Tronox will provide services to INEOS for information technology, finance, product stewardship, warehousing and human resources.

In addition, in order to obtain regulatory approval by the European Commission, we divested the 8120 paper laminate grade, supplied from our Botlek facility in the Netherlands, to Venator Materials PLC ("Venator"). The divestiture was completed on April 26, 2019. Under the terms of the divestiture, we will supply the 8120 grade product to Venator under a supply agreement for an initial term of 2 years, and extendable up to 3 years, to allow for the transfer of the manufacturing of the 8120 grade to Venator. Total cash consideration is 8 million Euros, of which 1 million Euros was paid at the closing, 3.5 million Euros (or approximately $3.9 million) was received during the second quarter of 2020 and 3.5 million Euros (approximately $4.2 million) was received in the second quarter of 2021. We recorded a charge of $19 million during the second quarter of 2019, in "Contract loss" in the Consolidated Statements of Operations, reflecting both the proceeds on sale and the estimated losses we expect to incur under the supply agreement with Venator.

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

Supplemental Pro Forma Financial Information

The following unaudited pro forma information was prepared pursuant to the requirements of ASC 805 and give effect to the Cristal Transaction as if it had occurred on January 1, 2018. The unaudited pro forma financial information reflects certain adjustments related to the acquisition, such as:

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

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

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

	Year Ended December 31, 2
Net Sales	$ 3,(
Net income from continuing operations attributable to Tronox Holdings plc	$

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

4. Restructuring Initiatives

In April 2019, we announced the completion of the Cristal Transaction. During the second quarter of 2019, as a result of the acquisition, we outlined a broad-based synergy savings program that is expected to reduce costs, simplify processes and focus the organization's structure and resources on key growth initiatives. During the years ended December 31, 2020 and 2019, we recorded costs of $3 million and $22 million, respectively, in our Consolidated Statement of Operations relating to these initiatives. No material balances were recorded during the year ended December 31, 2021. The costs consisted of charges for employee-related costs, including severance.

The liability balance for restructuring as of December 31, 2021, 2020 and 2019, which is recorded within "Accrued liabilities" in the Consolidated Balance Sheet, is as follows:

	Employee-Related Costs
Balance, January 1, 2019	$ —
Charges	22
Cash payments	(12)
Balance, December 31, 2019	$ 10
Charges	3
Cash payments	(11)
Balance, December 31, 2020	$ 2
Cash payments	(1)
Balance, December 31, 2021	$ 1

5. Revenue

Nature of Contracts and Performance Obligations

We primarily generate revenue from selling TiO_2 pigment products and related co-products, primarily zircon and pig iron, to our customers. These products are used for the manufacture of paints, coatings, plastics, paper, and a wide range of other applications. We account for a contract with our customer when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance, and collectability of consideration is probable.

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

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

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

Transaction Price

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

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

Revenue Recognition

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

Contract Balances

Contract assets represent our rights to consideration in exchange for products that have transferred to a customer when the right is conditional on situations other than the passage of time. For products that we have transferred to our customers, our rights to the consideration are typically unconditional and only the passage of time is required before payments become due. These unconditional rights are recorded as accounts receivable. As of December 31, 2021, and December 31, 2020, we did not have material contract asset balances.

Contract liabilities represent our obligations to transfer products to a customer for which we have received consideration from the customer. When a customer has poor credit worthiness, we may receive advance payment that is accounted for as deferred revenue. Deferred revenue is earned when control of the product transfers to the customer, which is typically within a short period of time from when we received the advanced payment. Contract liability balances as of December 31, 2021 and December 31, 2020 were $2 million and $4 million, respectively. Contract liability balances were reported as "Accrued liabilities" in the Consolidated Balance Sheets. All contract liabilities as of December 31, 2020 and 2019 were recognized as revenue in "Net sales" in the Consolidated Statements of Operations during the first quarter of 2021 and first quarter of 2020, respectively.

Disaggregation of Revenue

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

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

	Year Ended December 31,		
	2021	2020	2019
North America	$ 743	$ 716	$ 696
South and Central America	252	181	164
Europe, Middle-East and Africa	1,398	1,013	954
Asia Pacific	1,179	848	828
Total net sales	$ 3,572	$ 2,758	$ 2,642

The 2020 amounts by geographic area in table above have been corrected for an increase and decrease of $78 million to Asia Pacific and North America, respectively, as well as an increase and decrease of $134 million to Europe, Middle-East and Africa and South and Central America, respectively.

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

	Year Ended December 31,		
	2021	2020	2019
TiO_2	$ 2,793	$ 2,176	$ 2,049
Zircon	478	283	290
Feedstock and other products	301	299	303
Total net sales	$ 3,572	$ 2,758	$ 2,642

Feedstock and other products mainly include pig iron, ilmenite, chloride ("CP") slag, $TiCl_4$ and other mining products. The nature, amount, timing and uncertainty of revenue and cash flows typically do not differ significantly among different products.

6. Discontinued Operations and Other Disposition

Discontinued Operations - 2019

As discussed in Note 3, the Company divested Cristal's North American TiO_2 business to INEOS on May 1, 2019, for cash proceeds, net of transaction costs, of $701 million, inclusive of an amount for a working capital adjustment. The operating results of Cristal's North American TiO_2 business from the acquisition date to the date of divestiture are included in a single caption entitled "Net income (loss) from discontinued operations, net of tax" in our Consolidated Statements of Operations and is included in the table below.

The following table presents a summary of the operations of Cristal's North American TiO_2 business and Cristal Metals line items constituting the "Income from discontinued operations, net of tax" in our Consolidated Statements of Operations for the year ended December 31, 2019. There were no discontinued operations in 2021 and 2020.

	Year ended December 31, 2019
Net sales	$ 41
Cost of goods sold	29
Gross profit	12
Selling, general and administrative expense and other expenses	5
Income before income taxes	7
Income tax provision	2
Income from discontinued operations, net of tax	$ 5

7. Other Income, Net

Other income, net is comprised of the following:

	Year Ended December 31,		
	2021	2020	2019
Net realized and unrealized foreign currency gains (losses)	$ 16	$ 4	$ 5
Pension and postretirement benefit interest cost, expected return on assets and amortization of actuarial losses	5	1	(1)
Pension and postretirement benefit settlement and curtailment gains[1]	—	2	1
Insurance proceeds[2]	—	11	—
Breakage fee (Note 3)[3]	(18)	—	—
AMIC technical service support fee (Note 24)	8	5	—
Other, net	1	3	(2)
Total	$ 12	$ 26	$ 3

(1) 2020 and 2019 amounts are curtailment gains related to our former U.S. Pension Plan (acquired as part of the Cristal transaction). See Note 23.

(2) 2020 amount represents reimbursement from claims related to the Ginkgo concentrator failure we inherited as a part of the Cristal Transaction.

(3) 2021 amount represents the breakage fee associated with the termination of the TTI acquisition. See Note 3.

8. Income Taxes

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

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

	Year Ended December 31,		
	2021	2020	2019
United Kingdom	$ (16)	$ (12)	$
International	390	126	(1
Income (loss) from continuing operations before income taxes	$ 374	$ 114	$ (

The income tax (provision) benefit is summarized below:

	Year Ended December 31,		
	2021	2020	2019
United Kingdom:			
Current	$ (1)	$ (1)	$ —
Deferred	—	(10)	11
International:			
Current	(55)	(17)	(23)
Deferred	(15)	909	(2)
Income tax (provision) benefit	$ (71)	$ 881	$ (14)

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

	Year Ended December 31,		
	2021	2020	2019
Statutory tax rate	19 %	19 %	19 %
Increases (decreases) resulting from:			
Tax rate differences	7	10	5
Disallowable expenditures	2	17	(29)
Valuation allowances	(27)	(849)	(44)
Corporate reorganization	17	(96)	—
Tax rate changes	2	(8)	17
State and local taxes	1	5	(7)
Prior year accruals	(2)	131	24
Branch taxation	—	—	(1)
Withholding taxes	2	—	(2)
Tax credits	(2)	(2)	3
Deferred gross margin	—	—	(4)
Other, net	—	—	3
Effective tax rate	19 %	(773)%	(16)%

Tronox Holdings plc, a U.K. public limited company, became the public parent during the three months ended March 31, 2019. Prior to that time, Tronox Limited, was the public parent, registered under the laws of the State of Western Australia, but managed and controlled in the U.K. The statutory tax rate in the U.K. at December 31, 2021, 2020 and 2019 was 19%.

The effective tax rates in 2021, 2020 and 2019 are all influenced by a variety of factors, primarily income and losses in jurisdictions with valuation allowances, changes in tax rates, disallowable expenditures, prior year accruals, and rates different than the United Kingdom statutory rate of 19%. The 2021 rate is additionally impacted by the liquidation of an inactive Dutch

subsidiary and the write-off of its historical NOL balances as part of our corporate reorganization. Both the 2021 and 2020 rates are additionally impacted by a corporate reorganization related to our Australian entities and the amendment of prior year returns in resolution of a tax audit which impacted prior year accruals (see below for further discussion regarding the audit agreement). These Australian impacts are fully offset by valuation allowances. The large negative effective tax rate for 2020 is caused by the release of valuation allowances for deferred tax assets in the U.S. and Brazil, partially offset by the recording of valuation allowances in Saudi Arabia and the U.K. The 2019 rate was additionally impacted by a benefit of $48 million due to the release of a valuation allowance for deferred tax assets associated with our operating subsidiary in the Netherlands.

The Company reached an agreement with the Australian Tax Office ("ATO") during the year ended December 31, 2020 for the tax years 2016 through 2019 related to the companies operating in Australia acquired in the Cristal transaction, which were under examination by the ATO. Cash tax payments to be made pursuant to this agreement are not reflected in the above table due to the indemnification clause of the Cristal Transaction purchase contract. Refer to Note 24 for further information. As part of the agreement, $79 million in deferred tax assets related to Australian NOLs were lost. The change to deferred taxes is fully offset by a valuation allowance and results in no impact to the consolidated provision. The NOL adjustment from the ATO agreement is reflected in the "Prior year accruals" line of the effective tax rate table.

Changes in our state apportionment factors and state statutory rate changes caused our overall effective state tax rates to change. Due to the large deferred tax asset created by the Anadarko litigation settlement in 2014, these state rate changes have a material impact on deferred taxes for 2020 and 2019. These are reflected within the "Tax rate changes" line of the effective tax rate table and is offset by a valuation allowance for 2019. During 2020 and 2019, tax law changes fully repealed the future Netherlands rate reduction, and this benefit is also reflected in the "Tax rate changes" line.

Net deferred tax assets (liabilities) at December 31, 2021 and 2020 were comprised of the following:

	December 31,	
	2021	2020
Deferred tax assets:		
Net operating loss and other carryforwards	$ 1,720	$ 1,788
Property, plant and equipment, net	107	153
Reserves for environmental remediation and restoration	43	46
Obligations for pension and other employee benefits	58	57
Investments	4	3
Grantor trusts	636	637
Inventories, net	8	8
Interest	214	232
Lease liabilities	23	21
Other accrued liabilities	3	6
Foreign exchange	9	1
Other	7	8
Total deferred tax assets	2,832	2,960
Valuation allowance associated with deferred tax assets	(1,728)	(1,826)
Net deferred tax assets	1,104	1,134
Deferred tax liabilities:		
Inventories, net	(5)	(2)
Property, plant and equipment, net	(216)	(226)
Intangible assets, net	(22)	(30)
Lease assets	(24)	(22)
Foreign exchange	(1)	—
Other	(8)	(10)
Total deferred tax liabilities	(276)	(290)
Net deferred tax asset	$ 828	$ 844
Balance sheet classifications:		
Deferred tax assets — long-term	$ 985	$ 1,020
Deferred tax liabilities — long-term	$ (157)	$ (176)
Net deferred tax asset	$ 828	$ 844

The net deferred tax assets reflected in the above table include deferred tax assets related to grantor trusts, which were established as Tronox Incorporated emerged from bankruptcy during 2011. The balances relate to the assets contributed to such grantor trusts by Tronox Incorporated and the proceeds from the resolution of previous litigation of $5.2 billion during 2014,

which resulted in additional deferred tax assets of $2.0 billion. As the grantor trusts continue to spend funds received from the litigation and earn income from the investment of those funds, the U.S. net operating loss will increase or decrease.

There was a decrease to our valuation allowance of $98 million during 2021, a decrease of $965 million in 2020, and an increase of $172 million in 2019. The table below sets forth the changes, by jurisdiction:

	December 31,		
	2021	2020	2019
United Kingdom	$ (1)	$ (1)	$ (2)
United States	(19)	(944)	54
Australia	(43)	(17)	89
The Netherlands	(24)	2	—
Saudi Arabia	(11)	11	—
Brazil	—	(14)	14
Switzerland	—	—	15
Belgium	—	(2)	2
Total (decrease) increase in valuation allowances	$ (98)	$ (965)	$ 172

As part of the functions under business combination accounting pursuant to ASC 805 and deferred income taxes in accordance with ASC 740, the Company evaluated deferred tax attributes in each jurisdiction for application of a valuation allowance. Some operations acquired in the Cristal Transaction included a full or partial valuation allowance at the time of acquisition. Evidence provided to the Company that was maintained previously to support valuation allowances at acquisition was used along with considerations of any changes in operations and possible combinations with deferred tax attributes of the Company's existing operations in each jurisdiction. It was determined that France would remove its valuation allowance so that jurisdiction is not shown in the table above, Australia and Brazil would increase from partial to full valuation allowances, and Switzerland and the United States would sustain full valuation allowances at acquisition.

During the year ended December 31, 2021, operations in Saudi Arabia had a substantially positive improvement in its earnings. The Company's operations there not only turned from net losses to net income, but the amount of net income realized during 2021 and forecasted in the immediate future has been enough to overcome the losses sustained in prior years. A reversal of the valuation allowance in Saudi Arabia resulted in a non-cash deferred tax benefit of $8 million. This valuation allowance was established during the year ended December 31, 2020 against the net deferred tax assets in Saudi Arabia, and the addition of the valuation allowance in that period resulted in a non-cash deferred tax provision of $2 million.

During the year ended December 31, 2020, we determined sufficient positive evidence existed to reverse a portion of the valuation allowance attributable to the deferred tax assets associated with our operations in the U.S. This reversal resulted in a non-cash deferred tax benefit of $909 million. Our analysis considered all positive and negative evidence, including (i) three years of cumulative income for our U.S. subsidiaries, (ii) our continuing and improved profitability over the last twelve months in this jurisdiction, (iii) estimates of continued profitability based on updates to our latest forecasts, (iv) changes in the factors that drove losses in the past, primarily interest expenses incurred in the U.S., and (v) risk that certain deferred tax assets may be subject to limitation under Section 382 of the Code. Based on this analysis, we concluded that it was more likely than not that our U.S. subsidiaries will be able to utilize all of their deferred tax assets with an indefinite life. A portion of the U.S. deferred tax assets are attributable to NOLs incurred in prior years which are subject to expiration in future years. Our analysis did not support that these limited-life NOLs would be utilized before their expiration, and it is against these deferred tax assets in the U.S. that the Company continues to carry a valuation allowance with a current estimated value of $1,026 million.

During the year ended December 31, 2020, we also determined sufficient positive evidence existed to reverse the valuation allowance attributable to the deferred tax assets associated with our operations in Brazil. This reversal resulted in a non-cash deferred tax benefit of $8 million. Our analysis considered all positive and negative evidence, the most significant of which was the continuing and improved profitability of the Brazilian company subsequent to its acquisition in 2019 and estimates of continued profitability based on updates to our latest forecasts. Based on this analysis, we concluded that it is more likely than not that our Brazilian subsidiary will be able to utilize all of its deferred tax assets.

During the year ended December 31, 2020, we established a valuation allowance against the net deferred tax assets in the United Kingdom. The addition of this valuation allowance resulted in a non-cash deferred tax provision of $10 million. There has been increased profitability in this jurisdiction after the Cristal Transaction; however, it has not yet been sufficient to overcome our cumulative historical losses. Forecasted changes to intercompany interest is recent negative evidence now impacting our analysis. The company expects continued profitability in this jurisdiction but no longer has objective support which can be heavily weighted in this determination.

At December 31, 2021, we have full valuation allowances related to the total net deferred tax assets in Australia, Switzerland, and the United Kingdom, as we cannot objectively assert that these deferred tax assets are more likely than not to be realized. It is reasonably possible that a portion of these valuation allowances could be reversed within the next year due to increased book profitability levels. Future provisions for income taxes will include no tax benefits with respect to losses incurred and tax expense only to the extent of current tax payments until the valuation allowances are eliminated. Additionally, we have valuation allowances against specific tax assets in South Africa and the U.S.

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

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

The deferred tax assets generated by tax loss carryforwards in Australia, Switzerland, and the United Kingdom have been fully offset by valuation allowances. In the United States, the deferred tax assets generated by tax loss carryforwards are partially offset by a valuation allowance to the extent they are subject to expiration. The expiration of these carryforwards at December 31, 2021 is shown below. The Australian, Saudi Arabian, French, Brazilian and United Kingdom tax loss carryforwards do not expire.

	2022	2023	2024	2025	2026	2027 - 2040	Unlimited	Total Tax Loss Carryforwards
United Kingdom	$ —	$ —	$ —	$ —	$ —	$ —	$ (51)	$ (51)
Australia	—	—	—	—	—	—	(355)	(355)
The Netherlands	—	—	—	—	—	—	(100)	(100)
France	—	—	—	—	—	—	(214)	(214)
Saudi Arabia	—	—	—	—	—	—	(23)	(23)
Switzerland	(100)	(80)	—	—	—	(1)	—	(181)
U.S. Federal	—	—	—	—	—	(3,988)	(334)	(4,322)
U.S. State	(3)	(28)	(12)	(41)	(76)	(4,027)	(18)	(4,205)
Total tax loss carryforwards	$ (103)	$ (108)	$ (12)	$ (41)	$ (76)	$ (8,016)	$ (1,095)	$ (9,451)

At December 31, 2021, Tronox Holdings plc had foreign subsidiaries with undistributed earnings. Although we would not be subject to income tax on these earnings, amounts totaling $353 million could be subject to withholding tax if distributed. We have made no provision for deferred taxes for Tronox Holdings plc related to these undistributed earnings because they are in the specific jurisdictions which we assert are indefinitely reinvested outside of the parents' taxing jurisdictions.

The noncurrent liabilities section of our Consolidated Balance Sheet does not reflect any reserves for uncertain tax positions for either 2021 or 2020.

Our Chinese returns are closed through 2014. Our U.K. and Brazilian returns are closed through 2016. Our Australian, South African, and U.S. returns are closed through 2017. Our Netherlands and French returns are closed through 2018.

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

9. Income (Loss) Per Share

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

	Year Ended December 31,		
	2021	2020	2019
Numerator – Basic and Diluted:			
Net income (loss) from continuing operations	$ 303	$ 995	$ (1
Less: Net income from continuing operations attributable to noncontrolling interest	17	26	
Undistributed net income (loss) from continuing operations attributable to Tronox Holdings plc	286	969	(1
Net income from discontinued operations available to ordinary shares	—	—	
Net income (loss) available to ordinary shares	$ 286	$ 969	$ (1
Denominator – Basic and Diluted:			
Weighted-average ordinary shares, basic (in thousands)	152,056	143,355	139,8
Weighted-average ordinary shares, diluted (in thousands)	157,945	144,906	139,8
Net income (loss) per Ordinary Share:			
Basic net income (loss) from continuing operations per ordinary share	$ 1.88	$ 6.76	$ (0.
Basic net income (loss) from discontinued operations per ordinary share	—	—	0
Basic net income (loss) per ordinary share	$ 1.88	$ 6.76	$ (0.
Diluted net income (loss) from continuing operations per ordinary share	$ 1.81	$ 6.69	$ (0.
Diluted net income (loss) from discontinued operations per ordinary share	—	—	0
Diluted net income (loss) per ordinary share	$ 1.81	$ 6.69	$ (0.

Net income per ordinary share amounts were calculated from exact, unrounded net loss and share information. Prior to January 2019, we had issued shares of restricted stock which were participating securities that did not have a contractual obligation to share in losses; therefore, when we have a net loss, none of the loss is allocated to these participating securities. The restricted stock vested on January 29, 2019. Consequently, for the years ended December 31, 2021, 2020 and 2019, the two-class method did not have an effect on our net loss per ordinary share calculation, and as such, dividends paid during these periods did not impact this calculation.

In computing diluted net income per share under the two-class method, we considered potentially dilutive shares. Anti-dilutive shares not recognized in the diluted net income per share calculation for the years ended December 31, 2021, 2020 and 2019 were as follows:

	Shares		
	2021	2020	2019
Options	414,296	1,201,891	1,260,902
Restricted share units	—	1,054,994	5,557,659

10. Inventories, net

Inventories, net consisted of the following:

	December 31,	
	2021	2020
Raw materials	$ 265	$ 170
Work-in-process	117	103
Finished goods, net	461	668
Materials and supplies, net	205	196
Inventories, net	$ 1,048	$ 1,137

Materials and supplies, net consists of processing chemicals, maintenance supplies, and spare parts, which will be consumed directly and indirectly in the production of our products. During 2020, Tronox mining facilities sold feedstock to third party customers and as such, $110 million of feedstock was classified as "Finished goods, net" at December 31, 2020. During 2021, in line with our overall vertical integration strategy, there were no material feedstock sales to third party customers and as such, at December 31, 2021, $99 million of feedstock has been classified as "Raw materials".

At December 31, 2021 and 2020, inventory obsolescence reserves were $43 million and $41 million, respectively. At December 31, 2021 and December 31, 2020, reserves for lower of cost and net realizable value were $11 million and $29 million, respectively.

11. Property, Plant and Equipment

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

	December 31,	
	2021	2020
Land and land improvements	$ 188	$ 189
Buildings	365	368
Machinery and equipment	2,234	2,197
Construction-in-progress	263	192
Other	73	86
Total	3,123	3,032
Less: accumulated depreciation	(1,413)	(1,273)
Property, plant and equipment, net	$ 1,710	$ 1,759

Substantially all the Property, plant and equipment, net is pledged as collateral for our debt. See Note 15.

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

	Year Ended December 31,		
	2021	2020	2019
Cost of goods sold	$ 222	$ 233	$ 189
Selling, general and administrative expenses	5	5	5
Total	$ 227	$ 238	$ 194

12. Mineral Leaseholds, net

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

	December 31,	
	2021	2020
Mineral leaseholds	$ 1,306	$ 1,333
Less accumulated depletion	(559)	(530)
Mineral leaseholds, net	$ 747	$ 803

Depletion expense related to mineral leaseholds during 2021, 2020, and 2019 was $37 million, $33 million, and $56 million, respectively, and was recorded in "Cost of goods sold" in the Consolidated Statements of Operations.

13. Intangible Assets, net

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

	December 31, 2021			December 31, 2020		
	Gross Cost	Accumulated Amortization	Net Carrying Amount	Gross Cost	Accumulated Amortization	Net Carrying Amount
Customer relationships	$ 291	$ (211)	$ 80	$ 291	$ (193)	$ 98
TiO_2 technology	93	(31)	62	93	(24)	69
Internal-use software and other	120	(45)	75	73	(39)	34
Intangible assets, net	$ 504	$ (287)	$ 217	$ 457	$ (256)	$ 201

As of December 31, 2021 and 2020, internal-use software included approximately $68 million and $19 million, respectively, of capitalized software costs which are not being amortized as the software is not ready for its intended use.

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

	Year Ended December 31,		
	2021	2020	2019
Cost of goods sold	$ 2	$ 2	$ 2
Selling, general and administrative expenses	31	31	28
Total	$ 33	$ 33	$ 30

Estimated future amortization expense related to intangible assets is $34 million for 2022, $34 million for 2023, $33 million for 2024, $33 million for 2025, $15 million for 2026 and $68 million thereafter.

14. Balance Sheet and Cash Flows Supplemental Information

Accrued liabilities consisted of the following:

	December 31,	
	2021	2020
Employee-related costs and benefits	$ 155	$ 133
Related party payables	1	7
Interest	20	21
Sales rebates	36	43
Restructuring	1	2
Taxes other than income taxes	18	16
Asset retirement obligations	10	9
Interest rate swaps	25	57
Other accrued liabilities	62	62
Accrued liabilities	$ 328	$ 350

Additional supplemental cash flow information for the year ended and as of December 31, 2021, 2020 and 2019 is as follows:

Supplemental non cash information:	Year Ended December 31, 2021	2020	2019
Operating activities - MGT sales made to AMIC	$ 4	$ —	$ —
Operating activities - Interest expense on MGT loan	$ 1	$ —	$ —
Investing activities - Acquisition of MGT assets	$ —	$ 36	$ —
Financing activities - debt assumed in the acquisition of MGT assets	$ —	$ 36	$ —
Financing activities - Acquisition of noncontrolling interest	$ 125	$ —	$ —
Financing activities - Repayment of MGT loan	$ 3	$ —	$ —

	December 31, 2021	December 31, 2020	December 31, 2019
Capital expenditures acquired but not yet paid	$ 75	$ 37	$ 23

15. Debt

Long-term Debt

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

	Original Principal	Annual Interest Rate	Maturity Date	December 31, 2021	December 31, 2020
Prior Term Loan Facility, net of unamortized discount[1]	$ 2,150	Variable	9/22/2024	$ —	$ 1,607
New Term Loan Facility, net of unamortized discount[1]	1,300	Variable	3/11/2028	897	—
Senior Notes due 2025	450	5.75 %	10/1/2025	—	450
Senior Notes due 2026	615	6.50 %	4/15/2026	—	615
Senior Notes due 2029	1,075	4.63 %	3/15/2029	1,075	—
6.5% Senior Secured Notes due 2025	500	6.50 %	5/1/2025	500	500
Prior Standard Bank Term Loan Facility[1]	222	Variable	3/25/2024	—	115
New Standard Bank Term Loan Facility[1]	98	Variable	11/11/2026	92	—
Tikon Loan	N/A	Variable	5/23/2021	—	17
Australian Government Loan, net of unamortized discount	N/A	N/A	12/31/2036	1	1
MGT Loan[2]	36	Variable	Refer below	33	36
Finance leases				14	15
Long-term debt				2,612	3,356
Less: Long-term debt due within one year				(18)	(58)
Debt issuance costs				(36)	(35)
Long-term debt, net				$ 2,558	$ 3,263

[1]The average effective interest rate, including impacts of our interest rate swap, for the New Term Loan Facility was 5.1% for the year ended December 31, 2021. The average effective interest rate, including impacts of our interest rate swap, for the Prior Term Loan Facility was 4.6% for the year ended December 31, 2020. The average effective interest rate on the New Standard Bank Term Loan Facility was 7.3% for the year ended December 31, 2021. The average effective interest rate on the Prior Standard Bank Term Loan Facility was 7.8% for the year ended December 31, 2020.

[2]The MGT loan is a related party debt facility. Average effective interest rate on the MGT loan was 3.1% during the year ended December 31, 2021. Refer below for further details.

At December 31, 2021, the scheduled maturities of our long-term debt were as follows:

	Total Borrowings
2022	18
2023	18
2024	18
2025	518
2026	58
Thereafter	1,987
Total	2,617
Remaining accretion associated with the New Term Loan Facility and Australian Government Loan	(5)
Total borrowings	2,612

Prior Term Loan Facility and New Term Loan Facility

On September 22, 2017, we entered into a new senior secured first lien term loan facility (the "Prior Term Loan Facility") with the lenders party thereto and Bank of America, N.A., as administrative agent, with a maturity date of September 22, 2024. The Prior Term Loan Facility consisted of (i) a U.S. dollar term facility in an aggregate principal amount of $1.5 billion (the "Term Loans") with our subsidiary, Tronox Finance LLC ("Tronox Finance") as the borrower and (ii) a U.S. dollar term facility in an aggregate principal amount of $650 million (the "Blocked Term Loan") with our unrestricted subsidiary, Tronox Blocked Borrower LLC (the "Blocked Borrower") as the borrower, which Blocked Term Loan was funded into a blocked account. Upon consummation of the Cristal Transaction on April 10, 2019, the Blocked Borrower merged with and into Tronox Finance, and the Blocked Term Loan became available to Tronox Finance. The Prior Term Loan Facility bore interest at the "Applicable Rate" defined by reference to a grid-pricing matrix that relates to our First Lien Net Leverage Ratio and was issued net of an original issue discount of $11 million.

On February 25, 2019, we entered into an amendment to both our Prior Term Loan Facility and Wells Fargo Revolver (as defined below). The purpose of each amendment was to make certain of our U.K. subsidiaries restricted subsidiaries, update the relevant indebtedness disclosure schedules to include certain inter-company indebtedness that had been in existence prior to the execution of each such facility, and waive an administrative omission under such facility. As a result of this amendment, the Company made two mandatory principal prepayments on the Prior Term Loan Facility as follows: 1) $95 million subsequent to the issuance of the Prior Standard Bank Term Loan Facility in March 2019 and 2) $100 million subsequent to the divestiture of the Cristal North American TiO_2 business. The Company accounted for both of these mandatory principal prepayments as debt modifications in accordance with ASC 470. Additionally, in December 2019, the Company made a voluntary prepayment of $100 million on the Prior Term Loan Facility. As a result of the voluntary prepayment, we recorded $1 million in "Loss on extinguishment of debt" within the Consolidated Statement of Operations for the year ended December 31, 2019. No prepayment penalties were required as a result of these principal prepayments. In December 2020, the Company made a voluntary prepayment of $200 million on the Prior Term Loan Facility. As a result of the voluntary prepayment, we recorded $2 million in "Loss on extinguishment of debt" within the Consolidated Statement of Operations for the year ended December 31, 2020. No prepayment penalties were required as a result of this principal prepayment.

On March 11, 2021, Tronox Finance LLC entered into an amendment and restatement of its Prior Term Loan Facility pursuant to which, among other thing, we amended and restated the Prior Term Loan Facility with a new amended and restated first lien credit agreement dated as of September 22, 2017 (as amended through and including March 11, 2021, the "New Term Loan Facility") with a syndicate of lenders and HSBC Bank USA, National Association, as administrative agent and collateral agent. The New Term Loan Facility provides the Company with (a) a new seven-year New Term Loan Facility) in an aggregate principal amount of $1.3 billion and (b) new five-year cash flow revolving facility (the "New Revolving Facility") providing initial revolving commitments of $350 million and a sublimit of $125 million for letters of credit. The maturity date on the New Term Loan Facility and the New Revolving Facility is March 11, 2028 and March 11, 2026, respectively.

The New Term Loan Facility shall bear interest at either the base rate or an adjusted LIBOR rate, in each case plus an applicable margin. The applicable margin in respect of the New Term Loan Facility is either 1.50% or 1.25%, for base rate loans, or 2.50% or 2.25%, for adjusted LIBOR rate loans, in each case determined based on, initially the passage of time, and thereafter upon the Company's first lien net leverage ratio at the applicable time. Interest is payable on the New Term Loan Facility on the last business of each March, June, September and December. Based on our first lien net leverage ratio, the applicable margin under the New Term Loan Facility as of December 31, 2021 was LIBOR plus a margin of 2.25%. The New Revolving Facility shall bear interest at either the base rate or adjusted LIBOR rate, in each case plus an applicable margin. The applicable margin in respect of the New Revolving Facility is either 1.25%, 1.00% or 0.75% for base rate loans, or 2.25%, 2.00% or 1.75%, for

adjusted LIBOR Rate Loans, in each case determined based on, initially the passage of time, and thereafter upon the Company's first lien net leverage ratio at the applicable time. The New Credit Facility requires the Borrower to pay customary agency fees.

In connection with entering into the New Term Loan Facility, the Company terminated all remaining commitments and repaid all obligations under its Prior Term Loan Facility and Wells Fargo Revolver (defined below). Additionally, we repaid $313 million of the principal under the Prior Term Loan Facility with cash on hand.

Commencing June 30, 2021, the New Revolving Facility contains a springing financial covenant when a loan amount is drawn exceeding 35% of the New Revolving Facility. In this instance, the first lien net leverage ratio shall not exceed 4.75x at quarter end testing period.

As a result of this transaction in accordance with ASC 470, we recognized approximately $4 million in "Loss on Extinguishment of Debt" recorded in the Consolidated Statement of Operations for the year ended December 31, 2021.

As of December 31, 2021, there is no outstanding revolving credit loans under the New Revolving Facility, excluding $21 million of issued and undrawn letters of credit under the New Revolving Facility. Debt issuance costs associated with the New Revolving Facility of $2 million were included in "Other long-term assets" in the Consolidated Balance Sheets at December 31, 2021 and are being amortized over the life of the New Revolving Facility.

Additionally, during the year ended December 31, 2021, the Company made several voluntary prepayments totaling
$398 million on the New Term Loan Facility. As a result, we recognized approximately $9 million in "Loss on Extinguishment of Debt" recorded in the Consolidated Statement of Operations for the year ended December 31, 2021.

Senior Notes due 2025

On September 22, 2017, Tronox Finance plc, issued 5.75% senior notes due 2025 for an aggregate principal amount of $450 million (the "Senior Notes due 2025"), which notes were issued under an indenture dated September 22, 2017 (the "2025 Indenture"). The 2025 Indenture and the Senior Notes due 2025 provided among other things, that the Senior Notes due 2025 were senior unsecured obligations of Tronox Finance plc and were guaranteed on a senior and unsecured basis by us and certain of our other subsidiaries. The Senior Notes due 2025 were not registered under the Securities Act, and were not offered or sold in the U.S. absent registration or an applicable exemption from registration requirements. Interest was payable on April 1 and October 1 of each year beginning on April 1, 2018 until their maturity date of October 1, 2025. The terms of the 2025 Indenture, among other things, limited, in certain circumstances, the ability of us and certain of our subsidiaries to: incur secured indebtedness, engage in certain sale-leaseback transactions and merge, consolidate or sell substantially all of our assets. The terms of the 2025 Indenture also included certain limitations on our non-guarantor subsidiaries incurring indebtedness. During the year ended December 31, 2021, we paid the outstanding balance of $450 million on the Senior Notes due 2025 as a result of the issuance of the Senior Notes due 2029 as defined and discussed below.

Senior Notes due 2026

On April 6, 2018, Tronox Incorporated issued 6.5% Senior Notes due 2026 for an aggregate principal amount of $615 million ("Senior Notes due 2026"). The 2026 Indenture and the Senior Notes due 2026 provided, among other things, that the Senior Notes due 2026 were senior unsecured obligations of Tronox Incorporated and were guaranteed on a senior and unsecured basis by us and certain of our other subsidiaries. The Senior Notes due 2026 were not registered under the Securities Act and were not offered or sold in the U.S. absent registration or an applicable exemption from registration requirements. Interest was payable on April 15 and October 15 of each year beginning on October 15, 2018 until their maturity date of April 15, 2026. The terms of the 2026 Indenture, among other things, limited, in certain circumstances, our and certain of our subsidiaries ability to: incur secured indebtedness; engage in certain sale-leaseback transactions; and merge, consolidate or sell substantially all of our assets. The terms of the 2026 Indenture also included certain limitations on our non-guarantor subsidiaries incurring indebtedness. The proceeds of the offering were used to fund the redemption of our Senior Notes due 2022. During the year ended December 31, 2021, we paid the outstanding balance of $615 million on the Senior Notes due 2026 as a result of the issuance of the Senior Notes due 2029 as defined and discussed below.

Senior Notes due 2029

On March 15, 2021, Tronox Incorporated closed an offering of $1,075 million aggregate principal amount of its 4.625% senior notes due 2029 (the "Senior Notes due 2029"). The notes were offered at par and issued under an indenture dated as of March 15, 2021 among the Company and certain of the Company's restricted subsidiaries as guarantors and Wilmington Trust, National Association. The Senior Notes due 2029 provide, among other thing, that the Senior Notes due 2029 are guaranteed by the Company and certain of the Company's restricted subsidiaries, subject to certain exceptions. The Senior Notes due 2029 and related guarantees are the senior obligations of the Company and the guarantors. The Senior Notes due 2029 have not been registered under the Securities Act, or any state securities laws, and may not be offered or sold in the United States absent registration requirements. The terms of the indenture, among other things, limit, in certain circumstances, the ability of the

Company and its restricted subsidiaries to: incur secured indebtedness, incur indebtedness at a non-guarantor subsidiary, engage in certain sale-leaseback transactions and merge, consolidate or sell substantially all of their assets. Interest is payable on the Senior Notes due 2029 on March 15 and September 15 of each year beginning on September 15, 2021 until their maturity date of March 15, 2029.

During the year ended December 31, 2021, the Company repaid the outstanding principal balance of $615 million and $450 million on its Senior Notes due 2026 and its Senior Notes due 2025, respectively. As a result of this transaction, we recorded $52 million of debt extinguishment costs, including call premiums of $21 million and $19 million on the Senior Notes due 2026 and Senior Notes due 2025, respectively, in "Loss on Extinguishment of Debt" on the Consolidated Statement of Operations for the year ended December 31, 2021.

6.5% Senior Secured Notes due 2025

On May 1, 2020, Tronox Incorporated, a wholly-owned indirect subsidiary of the Company, issued 6.5% senior secured notes due 2025 for an aggregate principal amount of $500 million (the "6.5% Senior Secured Notes due 2025"), which were issued under an indenture dated May 1, 2020. A portion of the proceeds of this debt offering was utilized to repay the $200 million of the Company's outstanding borrowings under its Wells Fargo, Standard Bank, and Emirates revolvers which was originally borrowed during the first quarter of 2020 (as discussed below).

Prior Standard Bank Term Loan Facility

On March 25, 2019, our South African subsidiaries, Tronox KZN Sands Proprietary Limited and Tronox Mineral Sands Proprietary Limited, entered into the Prior Standard Bank Term Loan Facility with a maturity date of March 25, 2024. The Term Loan Facility consisted of (i) an aggregate principal amount of R2.6 billion (“Amortizing Loan”, approximately $163 million at December 31, 2021 exchange rate) the principal of which was to be paid back at 5 percent per quarter over the five year term of the loan, and (ii) an aggregate principal amount of R600 million (“Bullet Loan”) the principal of which was to be paid back at the maturity date of the Prior Standard Bank Term Loan Facility. During the third quarter of 2019, we repaid the outstanding balance on the Bullet Loan.

The Amortizing Loan bore interest at JIBAR plus 260 basis points when net leverage of the South African subsidiaries was less than 1.5 and JIBAR plus 285 points when net leverage was greater than 1.5.

During the year ended December 31, 2021, we made several voluntary prepayments totaling R1,040 million (approximately $69 million) on the Prior Standard Bank Term Loan Facility. No prepayment penalties were required as a result of this principal prepayment. Additionally, during the year ended December 31, 2021, we repaid the remaining outstanding balance of R390 million (approximately $26 million) of the Prior Standard Bank Term Loan Facility and entered into an amendment and restatement with Standard Bank as is discussed below.

New Standard Bank Term Loan Facility and Revolving Credit Facility

On October 1, 2021, Tronox Minerals Sands Proprietary Limited, a wholly-owned subsidiary of the Company, entered into an amendment and restatement of a new credit facility with Standard Bank. The new credit facility provides the Company with (a) a new five-year term loan facility in an aggregate principal amount of R1.5 billion (approximately $98 million) (the "New Standard Bank Term Loan Facility") and (b) a new three-year revolving credit facility (the "New Standard Bank Revolving Credit Facility") providing initial revolving commitments of R1.0 billion (approximately $63 million at December 31, 2021 exchange rate). The maturity date on the New Standard Bank Term Loan Facility and the New Standard Bank Revolving Credit Facility is November 11, 2026 and October 1, 2024, respectively. The New Standard Bank Term Loan Facility has a delayed draw feature up to thirty business days from the effective date of the executed credit agreement. Mandatory capital repayments of R37.5 million (approximately $2 million at December 31, 2021 exchange rate) are scheduled quarterly with the first mandatory repayment starting in December 2021.

Both the New Standard Bank Term Loan Facility and the New Standard Bank Revolving Credit Facility shall bear interest at an adjusted JIBAR rate plus an applicable margin. The applicable margin on the New Standard Bank Term Loan Facility is 2.35%. The applicable margin on the New Standard Bank Revolving Credit Facility is based upon average credit utilization during any interest period. If the revolving credit facility utilization is less than 33%, less than 66% but greater than 33%, or greater than 66%, the applicable margin is 2.10%, 2.25%, and 2.40%, respectively. The New Standard Bank Revolving Credit Facility requires the borrower to pay customary agency fees. Interest is payable on the New Standard Bank Term Loan Facility on each of March 31, June 30, September 30 and December 31, and the final maturity date pursuant to the agreement. Interest is payable on the New Standard Bank Revolving Credit Facility on the last day of the applicable interest period pursuant to the agreement.

Pursuant to the credit agreement, on November 11, 2021, the Company drew down the total outstanding principal balance of R1.5 billion (approximately $98 million) on the New Standard Bank Term Loan Facility.

Tikon Loan

As part of the Cristal Transaction, we acquired a working capital debt agreement in China ("Tikon Loan") that matured in April and May of 2021. The Tikon Loan bore interest based on an official lending basis rate per annum as announced and published by the People's Bank of China plus a 7% premium. During the year ended December 31, 2021, we repaid the remaining outstanding principal balance of CNY 111 million (approximately $17 million). No prepayment penalties were required as a result of these principal prepayments.

Australian Government Loan

As part of the Cristal Transaction, we acquired an interest-free loan with the Australian government ("Australian Government Loan") that matures in December 2022 subject to renewal every 5 years with final termination in December 2036. The loan balance due upon maturity is AUD 6 million (approximately $5 million at December 31, 2021). At December 31, 2021, the discounted value on the Australian Government Loan was approximately AUD 2 million (approximately $1 million at December 31, 2021 exchange rate).

MGT Loan

On December 17, 2020, we completed our agreement with Cristal to acquire certain assets co-located at our Yanbu facility which produce metal grade TiCl4 ("MGT") in exchange for a $36 million note payable. Repayment of the note payable is based on a fixed U.S. dollar per metric ton quantity of MGT delivered by us to Advanced Metal Industries Cluster and Toho Titanium Metal Co. Ltd (ATTM) over time and therefore the ultimate maturity date is variable in nature. If ATTM fails to purchase MGT from us under certain contractually agreed upon conditions, then at our election we may terminate the MGT supply agreement with ATTM and will no longer owe any amount under the loan agreement with Cristal. We currently estimate the ultimate maturity to be between approximately five to seven years, subject to actual future MGT production levels. The interest rate is based on the Saudi Arabian Interbank Offered Rate ("SAIBOR") plus a premium. As of December 31, 2021, the outstanding balance of the note payable was $33 million, of which $7 million is expected to be paid within the next twelve months (recorded within "Long-term debt due within one year" on our Consolidated Balance Sheet). Refer to Note 24 for further information on the MGT transaction.

Short-term Debt

Wells Fargo Revolver

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

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

The Wells Fargo Revolver amendment also modified certain components of the borrowing base in order to increase the potential availability of credit. We also voluntarily reduced the revolving credit lines under the Wells Fargo Revolver from $550 million to $350 million. As a result of this modification, during the year ended December 31, 2019, we recorded a charge of $2 million in "Loss on extinguishment of debt" within the Consolidated Statement of Operations.

As discussed above, the Wells Fargo Revolver was terminated during the year ended December 31, 2021 as a result of the New Revolving Facility.

ABSA Revolving Credit Facility

In connection with the Standard Bank Revolver (defined below) entered into on March 25, 2019, discussed below, the ABSA Revolver was terminated on March 26, 2019. As a result of the termination, during the year ended December 31, 2019, we recorded less than $1 million in "Loss on extinguishment of debt" within the Consolidated Statement of Operations.

Standard Bank Credit Facility

On March 25, 2019, our South African subsidiaries, Tronox KZN Sands Proprietary Limited and Tronox Mineral Sands Proprietary Limited, entered into the Standard Bank Credit Facility ("Standard Bank Revolver") for an amount up to R1 billion (approximately $63 million at December 31, 2021 exchange rate) maturing on March 25, 2022. The Standard Bank Credit Facility bore interest at the Johannesburg Interbank Average Rate ("JIBAR") plus 260 basis points when net leverage for our South African subsidiaries (total combined debt outstanding under the Standard Bank Revolver and Standard Bank Term less cash and cash equivalents divided by the consolidated EBITDA) was less than 1.5 and JIBAR plus 285 basis points when net leverage was greater than 1.5. As discussed above, during the year ended December 31, 2021, the Standard Bank Credit Facility was amended and restated with the New Standard Bank Revolving Credit Facility.

Emirates Revolver

As part of the Cristal transaction, we acquired a revolving credit facility with Emirates NBD PJSC. In March 2021, the Company entered into an amendment to extend the maturity date of the Emirates Revolver from March 31, 2021 to March 31, 2022. Under the Emirates Revolver, we have the ability to borrow up to approximately $60 million. The revolver is secured by inventory and trade receivables of Tronox Pigment UK Ltd. Under the terms of the revolver, for U.S. dollar borrowings the interest rate is LIBOR plus 2.25% while the interest rate for Euro borrowings is Euribor plus 2.25%. There were no borrowings outstanding under this revolver at December 31, 2021.

SABB Credit Facility

On October 16, 2019, our KSA subsidiary entered into a short-term working capital facility with the Saudi British Bank ("SABB Facility") for an amount up to SAR 70 million (approximately $19 million). The SABB Facility bears interest at the Saudi Inter Bank Offered Rate plus 180 basis points on outstanding balances. During October 2019, the Company borrowed SAR 50 million (or approximately $13 million) under the SABB Facility and subsequently repaid the outstanding balance in December 2019. Additionally, in March 2020, the Company borrowed SAR 50 million (or approximately $13 million) under the SABB Facility and subsequently repaid the outstanding balances. There is no borrowing outstanding under this facility at December 31, 2021. In December 2021, the Company extended the maturity date of the SABB Credit Facility from November 30, 2021 to November 30, 2022.

Debt Covenants

At December 31, 2021, we are in compliance with all financial covenants in our debt facilities.

Interest and Debt Expense, Net

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

	Year Ended December 31,		
	2021	2020	2019
Interest on debt	$ 148	$ 174	$ 186
Amortization of deferred debt issuance costs and discounts on debt	11	10	8
Capitalized interest	(7)	(2)	(1)
Interest on capital leases and letters of credit and commitments	5	7	8
Total interest and debt expense, net	$ 157	$ 189	$ 201

In connection with obtaining debt, we incurred debt issuance costs, which are being amortized through the respective maturity dates using the effective interest method for our long-term debt and on a straight-line basis for our New Revolving Facility. At December 31, 2021 and December 31, 2020, we had deferred debt issuance costs of $2 million and $2 million, respectively, related to the New Revolving Facility and Wells Fargo Revolver, respectively, which is recorded in "Other long-term assets" in the Consolidated Balance Sheets. At December 31, 2021 and December 31, 2020, we had debt discount of $5 million and $9 million, respectively, and debt issuance costs of $36 million and $35 million, respectively, primarily related to our term loan and senior notes, which were recorded as a direct reduction of the carrying value of the long-term debt in the Consolidated Balance Sheets.

16. Derivative Financial Instruments

Derivatives recorded on the Consolidated Balance Sheet:

The following table is a summary of the fair value of derivatives outstanding at December 31, 2021 and 2020:

	Fair Value			
	December 31, 2021		December 31, 2020	
	Assets(a)	Accrued Liabilities	Assets(a)	Accrued Liabilities
Derivatives Designated as Cash Flow Hedges				
Currency Contracts	$ 3	$ 1	$ 58	$ —
Interest Rate Swaps	$ —	$ 25	$ —	$ 57
Natural Gas Hedges	$ 1	$ —	$ —	$ —
Total Hedges	$ 4	$ 26	$ 58	$ 57
Derivatives Not Designated as Cash Flow Hedges				
Currency Contracts	$ —	$ —	$ 7	$ —
Total Derivatives	$ 4	$ 26	$ 65	$ 57

(a) At December 31, 2021 and 2020, current assets of $4 million and $65 million, respectively, are recorded in prepaid and other current assets on the Consolidated Balance Sheet.

Derivatives' Impact on the Consolidated Statement of Operations

The following table summarizes the impact of the Company's derivatives on the Consolidated Statement of Operations:

	Amount of Pre-Tax Gain (Loss) Recognized in Earnings								
	Revenue	Cost of Goods Sold	Other Income, net	Revenue	Cost of Goods Sold	Other Income, net	Revenue	Cost of Goods Sold	Other Income, net
	Year Ended December 31, 2021			Year Ended December 31, 2020			Year Ended December 31, 2019		
Derivatives Not Designated as Hedging Instruments									
Currency Contracts	$ —	$ —	$ 1	$ —	$ —	$ 4	$ —	$ —	$ 7
Derivatives Designated as Hedging Instruments									
Currency Contracts	$ (3)	$ 35	$ —	$ (7)	$ 3	$ —	$ 5	$ 3	$ —
Natural Gas	$ —	$ 3	$ —	$ —	$ (1)	$ —	$ —	$ —	$ —
Total Derivatives	$ (3)	$ 38	$ 1	$ (7)	$ 2	$ 4	$ 5	$ 3	$ 7

Interest Rate Risk

During the second quarter of 2019, we entered into interest-rate swap agreements with an aggregate notional value of $750 million representing a portion of our Term Loan Facility, which effectively converts the variable rate to a fixed rate for that portion of the loan. The agreements expire in September 2024. The Company's objectives in using the interest-rate swap agreements are to add stability to interest expense and to manage its exposure to interest rate movements. These interest rate swaps have been designated as cash flow hedges and involve the receipt of variable amounts from a counterparty in exchange for the Company making fixed-rate payments over the life of the agreements without exchange of the underlying notional amount. There was no impact associated with the New Term Loan Facility as the hedge remained highly effective.

Fair value gains or losses on these cash flow hedges are recorded in other comprehensive (loss) income and are subsequently reclassified into interest expense in the same periods during which the hedged transactions affect earnings. For the year ended

December 31, 2021, 2020 and 2019, the amounts recorded in interest expense related to the interest-rate swap agreements were $16 million, $10 million and less than $1 million, respectively. At December 31, 2021 and December 31, 2020, the net unrealized loss was $25 million and $57 million, respectively, and was recorded in "Accumulated other comprehensive loss" on the Consolidated Balance Sheet.

Foreign Currency Risk

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

As of December 31, 2021, we had notional amounts of 443 million Australian dollars (approximately $322 million at December 31, 2021 exchange rate) that expire between January 25, 2022 and December 23, 2022 to reduce the exposure of our Australian subsidiaries' cost of sales to fluctuations in currency rates. At December 31, 2021, we had notional amounts of 4.7 billion South African Rand (approximately $298 million at December 31, 2021 exchange rate) that expire between January 26, 2022 and December 28, 2022 to reduce the exposure of our South African subsidiaries' third party sales to fluctuations in currency rates. At December 31, 2021 and December 31, 2020, there was an unrealized net gain of $15 million and an unrealized net gain of $58 million, respectively, recorded in "Accumulated other comprehensive loss" on the Consolidated Balance Sheet, which is expected to be recognized in earnings over the next twelve months.

From time to time, we enter into foreign currency contracts to reduce exposure of our subsidiaries' balance sheet accounts not denominated in our subsidiaries' functional currency to fluctuations in foreign currency exchange rates. For accounting purposes, these foreign currency contracts are not considered hedges. The change in fair value associated with these contracts is recorded in "Other income, net" within the Consolidated Statement of Operations and partially offsets the change in value of third party and intercompany-related receivables not denominated in the functional currency of the subsidiary. At December 31, 2021, there was (i) 510 million South African Rand (or approximately $32 million at December 31, 2021 exchange rate) and (ii) 172 million Australian dollars (or approximately $125 million at December 31, 2021 exchange rate) of notional amount of outstanding foreign currency contracts.

17. Fair Value Measurement

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

Our debt is recorded at historical amounts. The following table presents the fair value of our debt and derivative contracts at both December 31, 2021 and December 31, 2020:

	December 31, 2021	December 31, 2020
Prior Term Loan Facility	$ —	$ 1,610
New Term Loan Facility	895	—
Prior Standard Bank Term Loan Facility	—	115
New Standard Bank Term Loan Facility	92	—
Senior Notes due 2025	—	468
Senior Notes due 2026	—	641
Senior Notes due 2029	1,071	—
6.5% Senior Secured Notes due 2025	526	536
Tikon Loan	—	17
Australian Government Loan	1	1
MGT Loan	33	36
Interest rate swaps	25	57
Foreign currency contracts, net	2	65

We determined the fair value of the Prior Term Loan Facility, the New Term Loan Facility, the Senior Notes due 2025, the Senior Notes due 2026, the Senior Notes due 2029 and the 6.5% Senior Secured Notes due 2025 using quoted market prices, which under the fair value hierarchy is a Level 1 input. We determined the fair value of the Prior Standard Bank Term Loan

Facility, the New Standard Bank Term Loan Facility and Tikon Loan utilizing transactions in the listed markets for similar liabilities, which under the fair value hierarchy is a Level 2 input. The fair value of the Australian Government Loan and MGT Loan is based on the contracted amount which is a Level 2 input.

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

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

18. Leases

Lease expense for the year ended December 31, 2021, 2020 and 2019 was comprised of the following:

	Year Ended December 31,		
	2021	2020	2019
Operating lease expense	$ 47	$ 48	$
Finance lease expense:			
Amortization of right-of-use assets	1	1	$
Interest on lease liabilities	2	2	$
Short term lease expense	30	26	$
Variable lease expense	23	22	$
Total lease expense	$ 103	$ 99	$

The table below summarizes lease expense for the year ended December 31, 2021, 2020 and 2019 recorded in the specific line items in our Consolidated Statements of Operations:

	Year Ended December 31,		
	2021	2020	2019
Cost of goods sold	$ 98	$ 91	$ 8(
Selling, general and administrative expenses	5	8	(
Total	$ 103	$ 99	$ 8(

The weighted-average remaining lease term in years and weighted-average discount rates at December 31, 2021 and 2020 were as follows:

	December 31, 2021	December 31, 2020
Weighted-average remaining lease term:		
Operating leases	8.7	3.3
Finance leases	8.8	9.6
Weighted-average discount rate:		
Operating leases	7.4 %	7.7 %
Finance leases	14.1 %	14.2 %

The maturity analysis for operating leases and finance leases at December 31, 2021 were as follows:

	Operating Leases	Finance Leases
2022	30	3
2023	15	3
2024	12	3
2025	8	3
2026	6	3
Thereafter	44	11
Total lease payments	115	26
Less: imputed interest	(34)	(12)
Present value of lease payments	$ 81	$ 14

Additional information relating to cash flows and ROU assets for the year ended December 31, 2021, 2020 and 2019 is as follows:

	December 31, 2021	December 31, 2020	December 31, 2019
Cash paid for amounts included in the measurement of lease liabilities:			
Operating cash flows used for operating leases	$ 51	$ 55	$ 41
Operating cash flows used for finance leases	$ 2	$ 2	$ 2
Financing cash flows used for finance leases	$ 1	$ 1	$ 1

Additional information relating to ROU assets for the year ended December 31, 2021 and 2020 is as follows:

	Year Ended December 31,	
	2021	2020
ROU assets obtained in exchange for lease obligations:		
Operating leases obtained in the normal course of business	$ 49	$ 29
Finance leases obtained in the normal course of business	$ 2	$ —

As of December 31, 2021, we have additional operating and finance leases, primarily for equipment and machinery, that have not yet commenced. The related ROU assets of the operating and finance leases are approximately $63 million and $40 million, respectively. These leases will commence later in 2022 with lease terms of between approximately 10 and 15 years.

19. Asset Retirement Obligations

Asset retirement obligations consist primarily of rehabilitation and restoration costs, landfill capping costs, decommissioning costs, and closure and post-closure costs. Activity related to asset retirement obligations was as follows:

	Year Ended December 31,	
	2021	2020
Balance, January 1	$ 166	$ 158
Additions	5	1
Accretion expense	12	12
Remeasurement/translation	(9)	7
Changes in estimates, including cost and timing of cash flows	(15)	(1)
Settlements/payments	(10)	(15)
Other acquisition and divestiture related	—	4
Balance, December 31	$ 149	$ 166

	December 31,	
	2021	2020
Asset retirement obligations were classified as follows:		
Current portion included in "Accrued liabilities"	$ 10	$ 9
Noncurrent portion included in "Asset retirement obligations"	139	157
Asset retirement obligations	$ 149	$ 166

We used the following assumptions in determining asset retirement obligations at December 31, 2021: inflation rates between 1.5% - 4.4% per year; credit adjusted risk-free interest rates between 3.9% -16.9%; the life of mines between 3-25 years and the useful life of assets between 1-32 years.

Environmental Rehabilitation Trust

In accordance with applicable regulations, we have established an environmental rehabilitation trust for the prospecting and mining operations in South Africa, which receives, holds, and invests funds for the rehabilitation or management of asset retirement obligations. The trustees of the fund are appointed by us and consist of sufficiently qualified employees capable of fulfilling their fiduciary duties. At December 31, 2021 and 2020, the environmental rehabilitation trust assets were $12 million and $12 million, respectively, which were recorded in "Other long-term assets" in the Consolidated Balance Sheets.

20. Commitments and Contingencies

Purchase and Capital Commitments—At December 31, 2021, purchase commitments were $231 million for 2022, $87 million for 2023, $122 million for 2024, $52 million for 2025, $105 million for 2026, and $58 million thereafter.

Letters of Credit—At December 31, 2021, we had outstanding letters of credit and bank guarantees of $53 million, of which $21 million were letters of credit and $32 million were bank guarantees. Amounts for performance bonds were not material.

Environmental Matters— It is our policy to record appropriate liabilities for environmental matters when remedial efforts are probable and the costs can be reasonably estimated. Such liabilities are based on our best estimate of the undiscounted future costs required to complete the remedial work. The recorded liabilities are adjusted periodically as remediation efforts progress or as additional technical, regulatory or legal information becomes available. Given the uncertainties regarding the status of laws, regulations, enforcement policies, the impact of other potentially responsible parties, technology and information related to individual sites, we do not believe it is possible to develop an estimate of the range of reasonably possible environmental loss in excess of our recorded liabilities. We expect to fund expenditures for these matters from operating cash flows. The timing of cash expenditures depends principally on the timing of remedial investigations and feasibility studies, regulatory approval of cleanup projects, remedial techniques to be utilized and agreements with other parties. Included in these environmental matters are the following:

Hawkins Point Plant. Residual waste mud, known as Batch Attack Mud, and a spent sulfuric waste stream were deposited in an onsite repository (the "Batch Attack Lagoon") at a former TiO_2 manufacturing site, Hawkins Point Plant in Baltimore, Maryland, operated by Cristal USA, Inc. from 1954 until 2011. We assumed responsibility for remediation of the Hawkins Point Plant when we acquired the TiO_2 business of Cristal in April 2019. In 1984, a predecessor of Cristal and the Maryland Department of the Environment ("MDE") entered into a consent decree (the "Consent Decree") to address the Batch Attack Lagoon. The Consent Decree required that Cristal close the Batch Attack Lagoon when the Hawkins Point Plant ceased operations. In addition, we are investigating whether hazardous substances are migrating from the Batch Attack Lagoon. As of December 31, 2021, a provision of $59 million is included in "Environmental liabilities" in our Consolidated Balance Sheet for the Hawkins Point Plant consistent with the accounting policy described above. We are in discussions with the MDE regarding a new consent decree to address both the Batch Attack Lagoon as well as other environmental contamination issues associated with the Hawkins Point Plant.

Other Matters— We are subject to a number of other lawsuits, investigations and disputes (some of which involve substantial amounts claimed) arising out of the conduct of our business, including matters relating to commercial transactions, prior acquisitions and divestitures, including our acquisition of Cristal, employee benefit plans, intellectual property, and environmental, health and safety matters. We recognize a liability for any contingency that is probable of occurrence and reasonably estimable. We continually assess the likelihood of adverse judgments of outcomes in these matters, as well as potential ranges of possible losses (taking into consideration any insurance recoveries), based on a careful analysis of each matter with the assistance of outside legal counsel and, if applicable, other experts. Included in these other matters is the following:

Venator Materials plc v. Tronox Limited. In May 2019, Venator Materials plc ("Venator") filed an action in the Superior Court of the State of Delaware alleging among other things that we owed Venator a $75 million "Break Fee" pursuant to the terms of a preliminary agreement dated July 14, 2018 (the "Exclusivity Agreement"). The Exclusivity Agreement required, among other things, Tronox and Venator to use their respective best efforts to negotiate a definitive agreement to sell the entirety of the National Titanium Dioxide Company Limited's ("Cristal's") North American operations to Venator if a divestiture of all or a substantial part of these operations were required to secure the approval of the Federal Trade Commission for us to complete our acquisition of Cristal's TiO_2 business. In June 2019, we denied Venator's claims and counterclaimed against Venator seeking to recover $400 million in damages from Venator that we suffered as a result of Venator's breaches of the Exclusivity Agreement. Specifically, we alleged, among other things, that Venator's failure to use best efforts constituted a material breach of the Exclusivity Agreement and directly resulted in and caused us to sell Cristal's North American operations to an alternative buyer for $701 million, $400 million less than the price Venator had agreed to in the Exclusivity Agreement. Though we believe that our interpretation of the Exclusivity Agreement is correct, there can be no assurance that we will prevail in litigation.

Western Australia Stamp Duty Matter. In May 2018, we lodged a pre-transaction determination request for a stamp duty exemption with the Western Australia Office of State Revenue (the "WA OSR") in connection with our re-domicile transaction (the "Re-Domicile Transaction") which was subsequently granted by the WA OSR in June 2018 on a preliminary basis. Immediately following the consummation of the Re-Domicile Transaction, we filed a confirmation request for the stamp duty exemption with the WA OSR. Following this confirmation request, we exchanged numerous communications with the WA OSR addressing questions raised and stating our position. In July 2021, the WA OSR informed us that they have reviewed their technical position on the applicability of the stamp duty exemption and have determined that such an exemption is disallowed based upon minor technicalities regarding the application of the governing set of rules. While the Company believe the rules were appropriately applied and will be successful in utilizing the exemption allowed, if an unfavorable ruling ultimately prevails it could result in a material charge to the financial statements. The Company is currently assessing its options with respect to this matter.

21. Accumulated Other Comprehensive Income (Loss) Attributable to Tronox Holdings plc and Other Equity Items

The tables below present changes in accumulated other comprehensive income (loss) by component for 2021, 2020 and 2019.

	Cumulative Translation Adjustment	Pension Liability Adjustment	Unrealized Gains (losses) on Derivatives	Total
Balance, January 1, 2019	$ (445)	$ (95)	$ —	$ (540)
Other comprehensive income (loss)	3	(11)	8	—
Acquisition of noncontrolling interest	(61)	—	—	(61)
Amounts reclassified from accumulated other comprehensive income (loss)	—	2	(7)	(5)
Balance, December 31, 2019	(503)	(104)	1	(606)
Other comprehensive income (loss)	12	(20)	(4)	(12)
Amounts reclassified from accumulated other comprehensive income (loss)	—	4	4	8
Balance, December 31, 2020	$ (491)	$ (120)	$ 1	$ (610)
Other comprehensive income (loss)	(103)	16	21	(66)
Acquisition of noncontrolling interest	(34)	—	—	(34)
Amounts reclassified from accumulated other comprehensive income (loss)	—	4	(32)	(28)
Balance, December 31, 2021	$ (628)	$ (100)	$ (10)	$ (738)

Repurchase of Common Stock

In addition to the repurchase of 14 million shares from Exxaro in 2019, on June 3, 2019, the Company's Board of Directors authorized the repurchase of up to $100 million of the Company's stock. During the year ended December 31, 2019, we purchased 7,453,391 shares under the authorization at an average price of $11.59 per share and at a cost of approximately

$87 million, including sales commissions and fees. We did not complete the full program given certain Section 382 restrictions related to our NOLs. Upon repurchase of the shares by the Company, the shares were cancelled.

On November 9, 2021, the Company's Board of Directors authorized the repurchase of up to $300 million of the Company's stock through February 2024. As of December 31, 2021, there were no repurchases as part of this program.

22. Share-based Compensation

Share-based compensation expense consisted of the following:

	Year Ended December 31,		
	2021	2020	2019
Total share-based compensation expense (continuing operations) from restricted shares and restricted share units	$ 31	$ 30	$ 32

The stock compensation expense for the year ended December 31, 2021 is inclusive of a a $3 million true up of expense due to the 2020 and 2021 performance grants as well as the acceleration of $2 million of stock compensation expense associated with the retirement agreement entered into with the former CEO on March 18, 2021. The stock compensation expense for the year ended December 31, 2020 is inclusive of a $4 million credit for the reversal of expense due to the 2018 performance grants.

Tronox Holdings plc Amended and Restated Management Equity Incentive Plan

On March 27, 2019, in connection with the Re-domicile Transaction, Tronox Holdings plc assumed the management equity incentive plan previously adopted by Tronox Limited, which plan was renamed the Tronox Holdings plc Amended and Restated Management Equity Incentive Plan. The amendments to the plan were made to provide, among other things, for the appropriate substitution of Tronox Holdings in place of Tronox Limited and to ensure the compliance with the laws of England and Wales law in place of Australian law. The MEIP permits the grant of awards that are comprised of incentive options, nonqualified options, share appreciation rights, restricted shares, restricted share units, performance awards, and other share-based awards, cash payments, and other forms as the compensation committee of the Board of Directors (the "Board") in its discretion deems appropriate, including any combination of the above. The maximum number of shares which were initially subjected to awards (inclusive of incentive options) was 20,781,225 ordinary shares and was increased by 8,000,000 on the affirmative vote of our shareholders on June 24, 2020.

Restricted Share Units ("RSUs")

On an annual basis, the Company grants RSUs which have time and/or performance conditions. Both the time-based awards and the performance-based awards are classified as equity awards.

2021 Grants - The Company granted both time-based and performance-based awards to certain members of management and to members of the Board. A total of 659,609 of time-based awards were granted to management which will vest ratably over a three-year period ending March 5, 2024. A total of 56,304 of time-based awards were granted to members of the Board of which will vest in May 2022. A total of 623,112 of performance-based awards were granted, of which 311,556 of the awards vest based on a relative Total Shareholder Return ("TSR") calculation and 311,556 of the awards vest based on certain performance metrics of the Company. The non-TSR performance-based awards vest on March 5, 2024 based on the achievement against the target average company performance of three separate performance periods, commencing on January 1 of each 2021, 2022, and 2023 and ending on December 31 of each 2021, 2022 and 2023, for which, for each performance period, the performance metric is an average annual return on invested capital (ROIC) improvement versus 2020 ROIC. Similar to the Company's historical TSR awards granted in prior years, the TSR awards vest based on the Company's three-year TSR versus the peer group performance levels. Given these terms, the TSR metric is considered a market condition for which we used a Monte Carlo simulation to determine the weighted average grant date fair value of $29.07.

Similar TSR awards were granted during 2020 and 2019 with grant date fair values of $10.00 and $12.65, respectively, which were calculated utilizing a Monte Carlo simulation. The following weighted-average assumptions were utilized to value the grants in 2021, 2020 and 2019:

	2021	2020	2019
Dividend yield	1.56 %	2.13 %	N/A
Expected historical volatility	71.10 %	58.30 %	67.20 %
Risk free interest rate	0.17 %	1.42 %	2.50 %
Expected life (in years)	3	3	3

The following table presents a summary of activity for RSUs for 2021:

	Number of Shares	Weighted Average Grant Date Fair Value
Outstanding, January 1, 2021	7,303,905	$ 12.39
Granted	1,339,025	20.91
Vested	(2,845,305)	14.49
Forfeited	(682,680)	15.16
Outstanding, December 31, 2021	5,114,945	$ 13.12
Expected to vest, December 31, 2021	7,049,472	$ 13.58

At December 31, 2021, there was $30 million of unrecognized compensation expense related to nonvested RSUs, adjusted for estimated forfeitures, which is expected to be recognized over a weighted-average period of 1.8 years. The weighted-average grant-date fair value of RSUs granted during 2021, 2020 and 2019 was $20.91 per unit, $8.89 per unit, and $10.81 per unit, respectively. The total fair value of RSUs that vested during 2021, 2020 and 2019 was $41 million, $30 million and $20 million, respectively.

Options

We did not issue any options during 2021 and 2020 and all our options outstanding are fully vested at December 31, 2021. The following table presents a summary of option activity for 2021:

	Number of Options	Weighted Average Exercise Price	Weighted Average Contractual Life (years)	Intrinsic Value
Outstanding, January 1, 2021	1,201,891	$ 21.60	2.19	$ —
Exercised	(424,832)	20.25		
Forfeited	—	—		
Expired	(20,732)	28.26		
Outstanding and Exercisable, December 31, 2021	756,327	$ 22.13	1.30	$ 2

The aggregate intrinsic values in the table represent the total pre-tax intrinsic value (the difference between our share price at the indicated dates and the options' exercise price, multiplied by the number of in-the-money options) that would have been received by the option holders had all option holders exercised their in-the-money options at the end of the year. The amount will change based on the fair market value of our stock. There were 424,832 options exercised during 2021 with a total intrinsic value of $2 million. We issue new shares upon the exercise of options. During 2021, we received $8 million, in cash for the exercise of stock options. There were no options exercised during both 2020 and 2019 and consequently there was no related intrinsic value. At December 31, 2021, 2020 and 2019, there was no unrecognized compensation expense related to options.

23. Pension and Other Postretirement Healthcare Benefits

The following provides information regarding our U.S. and foreign plans:

U.S. Plans

Pension and Postretirement Healthcare Plans— Tronox has one main U.S. defined benefit plan: the U.S. Qualified Plan. Prior to December 2020, the Company also had the U.S. Pension Plan (which was acquired as part of the Cristal acquisition). In December 2020, the U.S. Pension Plan was frozen and merged into the U.S. Qualified Plan. The U.S. Qualified Plan is a funded noncontributory qualified benefit plan which is in accordance with the Employee Retirement Income Security Act of 1974

("ERISA") and the Internal Revenue Code. We made contributions into funds managed by a third party, and those funds are held exclusively for the benefit of the plan participants. Benefits under the U.S. Qualified Plan were generally calculated based on years of service and final average pay. The U.S. Qualified Plan was frozen and closed to new participants on June 1, 2009. We also maintain one postretirement healthcare plan - the U.S. retiree welfare plan.

International Plans

Pension Plans — Tronox has international defined benefit commitments primarily in the United Kingdom ("U.K. DB Scheme") and Saudi Arabia. The U.K. DB Scheme is a funded qualified defined benefit plan in the United Kingdom, which is frozen with no additional benefits accruing to the participants. Benefits under the U.K. DB Scheme are generally calculated based on years of credit service and final compensation when benefits ceased to accrue as defined under the plan provisions. We also maintain a Saudi Arabia Cristal End of Service Benefit plan which provides end of service benefits to qualifying participants. End of service benefits are based on years of service and the reasons for which a participant's services to the Company are terminated.

Multiemployer Pension Plan - In prior periods, we maintained a defined benefit plan in the Netherlands (the "Netherlands Plan") to provide defined pension benefits to qualifying employees of Tronox Pigments (Holland) B.V. and its related companies. During 2014, the Netherlands Plan was replaced with a multiemployer plan, the Netherlands Contribution Plan (the "CDC Plan") effective January 1, 2015. Under the CDC Plan, employees earn benefits based on their pensionable salaries each year determined using a career average benefit formula. The collective bargaining agreement between us and the participants require us to contribute 20.4% of the participants' pensionable salaries into a pooled fund administered by the industry-wide PGB. The pensionable salary is the annual income of employees subject to a cap, which is adjusted each year to reflect the current requirements of the Netherlands' Wages and Salaries Tax Act of 1964. Our obligation under this plan is limited to the fixed percentage contribution we make each year. The employees are entitled to any returns generated from the investment activities of the fund.

The following table outlines the details of our participation in the CDC Plan for the year ended December 31, 2021. The CDC disclosures provided herein are based on the fund's 2020 annual report, which is the most recently available public information. Based on the total plan assets and accumulated benefit obligation information in the plan's annual report, the zone status was green as of December 31, 2020. A green zone status indicates that the plan was at least 80 percent funded. The "FIP/RP Status Pending/Implemented" column indicates whether a financial improvement plan (FIP) or a rehabilitation plan (RP) is either pending or has been implemented. As of December 31, 2021, we are not aware of any financial improvement or rehabilitation plan being implemented or pending. The last column lists the expiration date of the collective-bargaining agreement to which the plan is subject.

		Pension Protection Act Zone Status			Tronox Contributions			
Pension Fund	EIN/Pension Plan Number	2021	2020	FIP/RP Pending/ Implemented	2021	2020	Surcharge Imposed	Expiration date of Collective-Bargaining Agreement
PGB	NA	N/A	Green	No	$ 5	$ 5	No	12/31/2024

On the basis of the information available in the CDC Plan 2020 annual report, our contribution does not constitute more than 5 percent of the total contribution to the plan by all participants. During 2021, the fund did not impose any surcharge on us.

Postretirement Healthcare Plans — We also maintain postretirement healthcare plans in South Africa (the "South African Plan") and Brazil (the "Brazil Medical Plan"). The South African Plan provides medical and dental benefits to certain South African employees, retired employees and their registered dependents. The South African Plan provides benefits as follows: (i) members employed before March 1, 1994 receive 100% post-retirement and death-in-service benefits; (ii) members employed on or after March 1, 1994 but before January 1, 2002 receive 2% per year of completed service subject to a maximum of 50% post-retirement and death-in-service benefits; and, (iii) members employed on or after January 1, 2002 receive no post-retirement and death-in-service benefits. The Brazil Medical Plan provides post-employment medical benefits to employees who contributed to the medical plan while employed. Retirees receiving a benefit under the plan are required to pay a contribution that varies based on the coverage level elected.

Pension and Postretirement Benefit Costs / Obligations

Benefit Obligations and Funded Status — The following provides a reconciliation of beginning and ending benefit obligations, beginning and ending plan assets, funded status, and balance sheet classification of our U.S. and international pension plans and other post-retirement benefit plans ("OPEB") as of and for the years ended December 31, 2021 and 2020. The benefit

obligations and plan assets associated with our principal benefit plans are measured on December 31.

	Pensions				Other Post Retirement Benefit Plans			
	December 31				December 31			
	2021		2020		2021		2020	
	US	International	US	International	US	International	US	International
Change in benefit obligations:								
Benefit obligation, beginning of year	$ 399	$ 252	$ 398	$ 232	$ 2	$ 23	$ 2	$ 13
Service cost	—	4	1	4	—	1	—	—
Interest cost	10	4	12	5	—	2	—	1
Net actuarial (gains) losses	(10)	(10)	28	20	—	(3)	—	3
Curtailments	—	—	(2)	—	—	—	—	(1)
Settlements	—	—	(7)	(6)	—	—	—	—
Plan amendments[1]	—	—	—	—	—	(4)	—	9
Foreign currency rate changes	—	(2)	—	6	—	(2)	—	(2)
Benefits paid	(30)	(14)	(31)	(9)	—	(1)	—	—
Benefit obligation, end of year [2]	369	234	399	252	2	16	2	23
Change in plan assets:								
Fair value of plan assets, beginning of year	344	195	319	186	—	—	—	—
Actual return on plan assets	23	(3)	41	15	—	—	—	—
Employer contributions	—	6	22	3	—	1	—	—
Benefits paid	(30)	(14)	(31)	(9)	—	(1)	—	—
Foreign currency rate changes	—	(1)	—	6	—	—	—	—
Settlements	—	—	(7)	(6)	—	—	—	—
Fair value of plan assets, end of year	337	183	344	195	—	—	—	—
Net underfunded status of plans	$ (32)	$ (51)	$ (55)	$ (57)	$ (2)	$ (16)	$ (2)	$ (23)
Classification of amounts recognized in the Consolidated Balance Sheets:								
Other long-term assets	$ —	$ 20	$ —	$ 14	$ —	$ —	$ —	$ —
Accrued liabilities	—	(4)	—	(5)	(1)	—	—	—
Pension and postretirement healthcare benefits	(32)	(67)	(55)	(66)	(1)	(16)	(2)	(23)
Total liabilities	(32)	(71)	(55)	(71)	(2)	(16)	(2)	(23)
Accumulated other comprehensive (income) loss	81	10	98	12	—	3	—	12
Total	$ 49	$ (41)	$ 43	$ (45)	$ (2)	$ (13)	$ (2)	$ (11)

(1) Relates to a plan amendment entered into during both 2021 and 2020 related to the Brazil Medical Plan.

(2) Since the benefits under the U.S Qualified Plan and the U.K. DB Scheme are frozen, the projected benefit obligation and accumulated benefit obligation are the same.

Contributions

At a minimum, Tronox contributes to its pension plans to comply with local regulatory requirements (e.g., ERISA in the United States). Discretionary contributions in excess of the local minimum requirements are made based on many factors, including long-term projections of the plans' funded status, the economic environment, potential risk of overfunding, pension insurance costs and alternative uses of the cash. Changes to these factors can impact the timing of discretionary contributions from year to year. Pension contributions were less than $1 million in 2021 and are currently expected to be less than $1 million in 2022.

The following table provides information for pension plans where the accumulated benefit obligation exceeds the fair value of the plan assets:

	Pensions	
	2021	
	US	International
Projected benefit obligation (PBO)	$ 369	$ 71
Accumulated benefit obligation (ABO)	$ 369	$ 47
Fair value of plan assets	$ 337	$ —

Expected Benefit Payments — The following table shows the expected cash benefit payments for the next five years and in the aggregate for the years 2027 through 2031:

	2022	2023	2024	2025	2026	2027-2031
Pensions - US	$ 32	$ 29	$ 28	$ 27	$ 26	$ 1
Pensions - International	$ 11	$ 9	$ 10	$ 11	$ 11	$
Other Post Retirement Benefit Plans - US	$ —	$ —	$ —	$ —	$ —	$
Other Post Retirement Benefit Plans - International	$ —	$ —	$ 1	$ 1	$ 1	$

Retirement and Postretirement Healthcare Expense — The table below presents the components of net periodic cost associated with the U.S. and foreign plans recognized in the Consolidated Statements of Operations for 2021, 2020, and 2019:

	Pensions			Other Postretirement Benefit Plans		
	Year Ended December 31,			Year Ended December 31,		
	2021	2020	2019	2021	2020	2019
Net periodic cost:						
Service cost	$ 4	$ 5	$ 4	$ 1	$ —	$
Interest cost[1]	14	17	21	2	1	
Expected return on plan assets[1]	(26)	(22)	(22)	—	—	
Net amortization of actuarial loss[1]	5	4	2	1	—	
Settlement losses (gains)[1]	—	—	(1)	—	—	
Curtailment (gains)[1]	—	(2)	—	—	—	
Total net periodic cost - continuing operations	$ (3)	$ 2	$ 4	$ 4	$ 1	$

(1) Recorded in Other income, net in the Consolidated Statement of Operations.

Assumptions —

The following weighted average assumptions were used to determine net periodic cost:

	Pension					
	2021		2020		2019	
	US	International	US	International	US	International
Discount rate	2.60 %	1.47 %	3.39 %	1.98 %	4.34 %	2.50 %
Expected return on plan assets	6.70 %	2.50 %	6.03 %	2.50 %	5.69 %	3.00 %

	OPEB					
	2021		2020		2019	
	US	International	US	International	US	International
Discount rate	2.59 %	10.19 %	3.36 %	8.72 %	4.00 %	10.25 %
Expected return on plan assets	N/A	N/A	N/A	N/A	N/A	N/A

The following weighted average assumptions were used in estimating the actuarial present value of benefit obligations:

	Pensions					
	2021		2020		2019	
	US	International	US	International	US	International
Discount rate	2.97 %	1.87 %	2.60 %	1.45 %	3.39 %	1.98 %
Rate of compensation increase	N/A	4.68 %	3.00 %	4.65 %	3.00 %	4.67 %

	OPEB					
	2021		2020		2019	
	US	International	US	International	US	International
Discount rate	2.83 %	10.33 %	2.59 %	9.51 %	3.36 %	9.91 %
Rate of compensation increase	N/A	N/A	N/A	N/A	N/A	N/A

For the U.S. Qualified Plan, the mortality assumption was updated on December 31, 2021 to use the Society of Actuaries' most recently published generational projection scale (i.e. MP-2021) and base table (i.e. Pri-2012). The mortality improvement scale that had been used as of December 31, 2020 was the MP-2020 projection scale and the base table was Pri-2012.

Expected Return on Plan Assets — In forming the assumption of the U.S. and international long-term rate of return on plan assets, we considered the expected earnings on funds already invested, earnings on contributions expected to be received in the current year, and earnings on reinvested returns. The long-term rate of return estimation methodology for the Company's pension plans is based on a capital asset pricing model using historical data and a forecasted earnings model. An expected return on plan assets analysis is performed which incorporates the current portfolio allocation, historical asset-class returns, and an assessment of expected future performance using asset-class risk factors.

Discount Rate — The 2021 and 2020 rates were selected based on the results of a cash flow matching analysis, which projected the expected cash flows of the plans using a yield curves model developed from a universe of Aa-graded U.S. currency corporate bonds (obtained from Bloomberg) with BVAL scores of 6 or greater.

Plan Assets — The investments of the U.S. and International pension plans are managed to meet the future expected benefit liabilities of the plan over the long term by investing in diversified portfolios consistent with prudent diversification and historical and expected capital market returns. Tronox's U.S. and international pension plans' weighted-average asset allocations at December 31, 2021 and 2020, and the target asset allocation ranges, by major asset category, are as follows:

	December 31,							
	2021				2020			
	US		International		US		International	
	Actual	Target	Actual	Target	Actual	Target	Actual	Target
Equity securities	49 %	49 %	— %	— %	43 %	42 %	— %	— %
Debt securities	46	48	43	43	39	40	39	30
Real estate	1	—	—	—	1	—	—	—
Other	4	3	57	57	17	18	61	70
Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

The fair values of pension investments as of December 31, 2021 are summarized below:

	Fair Value Measurement at December 31, 2021 Using:									
	Quoted Prices in Active Markets for Identical Assets (Level 1)		Significant Other Observable Inputs (Level 2)		Significant Unobservable Inputs (Level 3)		Total			
Asset category:										
Equities securities:										
Global equity securities	$	93	(1)	$	—		$	—		$ 93
Global comingled equity funds		73	(2)		—			—		73
Debt securities:										
US government bonds		81	(3)		—			—		81
Foreign government bonds		39	(3)		—			—		39
US corporate bonds		—			73	(4)		—		73
Foreign corporate bonds		—			42	(4)		—		42
Real Estate:										
Property/ real estate fund		—			1	(5)		—		1
Other:										
Insurance contracts		—			—			98	(7)	98
Cash & cash equivalents		19	(6)		—			—		19
Total at fair value	$	305		$	116		$	98		$ 519

(1) For global equity securities, this category is comprised of shares of common stock in both U.S. and international companies from a diverse set of industries and size. Common stock is valuated at the closing market price reported on a U.S. or international exchange where the security is actively traded. Equity securities are classified within level 1 of the fair value hierarchy.

(2) Global commingled equity funds are comprised of managed funds that invest in common stock of both U.S. and international companies shares from a diverse set of industries and size. Common stock are valued at the closing market price reported on a U.S. or international exchange where the security is actively traded. These funds are classified within level 1 of the fair value hierarchy.

(3) For US and foreign government bonds, this category includes U.S. treasuries, U.S. federal agency obligations and international government debt. The fair value of these investments are based on observable quoted prices on active exchanges, which are level 1 inputs.

(4) For US corporate bonds and foreign corporate bonds, this category is comprised of corporate bonds of U.S. and foreign companies from a diverse set of industries and size. The fair values for the U.S. and foreign corporate bonds are determined using quoted prices of similar securities in active markets and observable data or broker or dealer quotations. The fair values for these investments are classified as level 2 within the valuation hierarchy.

(5) For property / real estate funds, this category includes real estate properties, partnership equities and investments in operating companies. The fair value of the assets is determined using discounted cash flows by estimating an income stream for the property plus a reversion into a present value at a risk adjusted rate. Yield rates and growth assumptions utilized are derived from market transactions as well as other financial and industry data. The fair value of these investments are classified as level 2 in the valuation hierarchy.

(6) Cash and cash equivalents include cash and short-interest bearing investments with maturities of three months or less. Investments are valued at cost plus accrued interest. Cash and cash equivalents are classified within level 1 of the valuation hierarchy.

(7) For insurance contracts, the fair value is estimated as the cost of purchasing equivalent annuities on terms consistent with those currently available in the market. The contracts are with highly rated insurance companies and are classified within level 3 of the valuation hierarchy. The following table summarizes changes in fair value of the pension plan assets classified as level 3 for the year ended December 31, 2021:

	Insurance Contracts
Balance, December 31, 2020	$ 111
Actual return on plan assets	(6)
Purchases, sales, settlements	(6)
Transfers in/out of Level 3	—
Foreign currency translation	(1)
Balance, December 31, 2021	$ 98

The fair values of pension investments as of December 31, 2020 are summarized below:

	Fair Value Measurement at December 31, 2020, Using:			
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
Asset category:				
Equities securities:				
Global equity securities	$ 83 (1)	$ —	$ —	$ 83
Global comingled equity funds	66 (2)	—	—	66
Debt securities:				
US government bonds	70 (3)	—	—	70
Foreign government bonds	37 (3)	—	—	37
US corporate bonds	—	62 (4)	—	62
Foreign corporate bonds	—	43 (4)	—	43
Real Estate:				
Property/ real estate fund	—	1 (5)	—	1
Other:				
Insurance contracts	—	—	111 (7)	111
Cash & cash equivalents	66 (6)	—	—	66
Total at fair value	$ 322	$ 106	$ 111	$ 539

(1) For global equity securities, this category is comprised of shares of common stock in both U.S. and international companies from a diverse set of industries and size. Common stock is valuated at the closing market price reported on a U.S. or international exchange where the security is actively traded. Equity securities are classified within level 1 of the fair value hierarchy.

(2) Global commingled equity funds are comprised of managed funds that invest in common stock of both U.S. and international companies shares from a diverse set of industries and size. Common stock are valued at the closing market price reported on a U.S. or international exchange where the security is actively traded. These funds are classified within level 1 of the fair value hierarchy.

(3) For US and foreign government bonds, this category includes U.S. treasuries, U.S. federal agency obligations and international government debt. The fair value of these investments are based on observable quoted prices on active exchanges, which are level 1 inputs.

(4) For US corporate bonds and foreign corporate bonds, this category is comprised of corporate bonds of U.S. and foreign companies from a diverse set of industries and size. The fair values for the U.S. and foreign corporate bonds are determined using quoted prices of similar securities in active markets and observable data or broker or dealer quotations. The fair values for these investments are classified as level 2 within the valuation hierarchy.

(5) For property / real estate funds, this category includes real estate properties, partnership equities and investments in operating companies. The fair value of the assets is determined using discounted cash flows by estimating an income stream for the property plus a reversion into a present value at a risk adjusted

rate. Yield rates and growth assumptions utilized are derived from market transactions as well as other financial and industry data. The fair value of these investments are classified as level 2 in the valuation hierarchy.

(6) Cash and cash equivalents include cash and short-interest bearing investments with maturities of three months or less. Investments are valued at cost plus accrued interest. Cash and cash equivalents are classified within level 1 of the valuation hierarchy.

(7) For insurance contracts, the fair value is estimated as the cost of purchasing equivalent annuities on terms consistent with those currently available in the market. The contracts are with highly rated insurance companies and are classified within level 3 of the valuation hierarchy. The following table summarizes changes in fair value of the pension plan assets classified as level 3 for the year ended December 31, 2020:

	Insurance Contracts
Balance, December 31, 2019	$ 104
Actual return on plan assets	9
Purchases, sales, settlements	(5)
Transfers in/out of Level 3	—
Foreign currency translation	3
Balance, December 31, 2020	$ 111

Defined Contribution Plans

U.S. Savings Investment Plan

In 2006, we established the U.S. Savings Investment Plan (the “SIP”), a qualified defined contribution plan under Section 401(k) of the Internal Revenue Code. Under the SIP, our regular full-time and part-time employees contribute a portion of their earnings, and we match these contributions up to a predefined threshold. Our matching contribution is 100% of the first 6% of employee contributions. Effective January 1, 2013, we established a profit sharing contribution at 6% of employees’ pay (“discretionary contribution”). A discretionary contribution of 6% was made for 2021, 2020 and 2019. Our matching contribution to the SIP vests immediately; however, our discretionary contribution is subject to vesting conditions that must be satisfied over a three-year vesting period. Contributions under the SIP, including our match, are invested in accordance with the investment options elected by plan participants. Compensation expenses associated with our matching contribution to the SIP was $5 million, $4 million and $4 million during 2021, 2020 and 2019, respectively, which was included in “Selling, general and administrative expenses” in the Consolidated Statements of Operations. Compensation expense associated with our discretionary contribution was $5 million in 2021, $4 million in 2020 and $4 million in 2019, which was included in “Selling, general and administrative expenses” in the Consolidated Statements of Operations.

U.S. Benefit Restoration Plan

In 2006, we established the U.S. Benefit Restoration Plan (the “BRP”), a nonqualified defined contribution plan, for employees whose eligible compensation is expected to exceed the IRS compensation limits for qualified plans. Under the BRP, participants can contribute up to 20% of their annual compensation and incentive. Our matching contribution under the BRP is the same as the SIP. Our matching contribution under this plan vests immediately to plan participants. Contributions under the BRP, including our match, are invested in accordance with the investment options elected by plan participants. Compensation expense associated with our matching contribution to the BRP was $1 million, $1 million and $2 million during 2021, 2020 and 2019, respectively, which was included in “Selling, general and administrative expenses” in the Consolidated Statements of Operations.

South Africa Defined Contribution Plans

Tronox Mineral Sands Proprietary Limited, a wholly owned subsidiary of the Company, participates in several defined contribution plans which are registered in the Republic of South Africa and are governed by the South African Pension Funds Act of 1956. These plans provide retirement and other benefits to all permanent employees, and where applicable, retired employees and their dependents. The Company contributes a range of 10% to 15% (depending on the plan) of the employees' predefined pre-tax pensionable earnings. Compensation expense associated with these plans was $5 million, $4 million, and $4 million during 2021, 2020 and 2019, respectively, which was included in both "Costs of goods sold" and "Selling, general and administrative expenses" in the Consolidated Statements of Operations.

24. Related Party Transactions

Exxaro

In connection with the Company's acquisition in 2012 of Exxaro Resources Limited's ("Exxaro") mineral sands business, Exxaro was granted a "flip in" right such that following the occurrence of certain events, Exxaro could exercise a put option, or the Company could exercise a call option, whereby Exxaro exchanges its 26% shareholding in the Company's South African operating subsidiaries which hold the Company's material mining licenses (the "South African Subsidiaries Interest") for an additional 7,246,035 of our ordinary shares. On November 26, 2018, the Company, certain of the Company's subsidiaries and Exxaro entered into the Exxaro Mineral Sands Transaction Completion Agreement which amended the "flip in" rights granted to Exxaro to accelerate the occurrence of the "flip in" upon satisfaction of certain conditions, which have now been satisfied. On February 23, 2021, we exercised our call option to complete the "flip in" transaction, pursuant to which we issued to Exxaro 7,246,035 new ordinary shares of the Company in exchange for Exxaro's South African Subsidiaries Interest. In addition, on March 1, 2021, Exxaro sold its entire share ownership in us, including the "flip-in" shares, totaling 21,975,315 ordinary shares in an underwritten public offering.

Tasnee/Cristal

On April 10, 2019, we announced the completion of the acquisition of the TiO_2 business of Cristal for $1.675 billion of cash, subject to a working capital and noncurrent liability adjustment, plus 37,580,000 ordinary shares. At December 31, 2021, Cristal International Holdings B.V. (formerly known as Cristal Inorganic Chemical Netherlands Cooperatief W.A.), a wholly-owned subsidiary of Tasnee, continues to own 37,580,000 shares of Tronox, or a 24% ownership interest. In February 2020, Tronox and Cristal resolved the working capital and noncurrent liability adjustment by agreeing that no payment was required by either party.

On May 9, 2018, we entered into an Option Agreement with AMIC which is owned equally by Tasnee and Cristal. Under the terms of the Option Agreement, AMIC granted us an option (the "Option") to acquire 90% of a special purpose vehicle (the "SPV"), to which AMIC's ownership in a titanium slag smelter facility (the "Slagger") in The Jazan City for Primary and Downstream Industries in KSA will be contributed together with $322 million of AMIC indebtedness (the "AMIC Debt"). The AMIC Debt would remain outstanding debt of the SPV upon exercise of the Option. The Option may be exercised if the Slagger achieves certain production criteria related to sustained quality and tonnage of slag produced (the "Option Criteria"). Likewise, AMIC may require us to acquire the Slagger on the same terms if the Option Criteria are satisfied. Furthermore, 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 (the "Tronox Loans"). We have lent AMIC the Tronox Loans maximum amount of $125 million which is recorded within "Other long-term assets" on the Consolidated Balance Sheet as of both December 31, 2021 and 2020 as well as the related interest of $9 million and $6 million, respectively. The Option did not have a significant impact on the financial statements as of or for the periods ended December 31, 2021 and 2020.

On May 13, 2020, we amended the Option Agreement (the "First Amendment") with AMIC to address circumstances in which the Option Criteria cannot be satisfied. Pursuant to the First Amendment, Tronox has the right to acquire the SPV in exchange for (i) our forgiveness of the Tronox Loans principal and accrued interest thereon, and (ii) the SPV's assumption of $36 million of indebtedness plus accrued interest thereon lent by AMIC to the SPV. Under the First Amendment, the SPV would not assume any of the AMIC Debt.

Additionally, on May 13, 2020, we amended a Technical Services Agreement that we had entered with AMIC on March 15, 2018, to add project management support services. Under this arrangement, AMIC and its consultants are still responsible for engineering and construction of the Slagger while we provide technical advice and project management services including supervision and management of third party consultants intended to satisfy the Option Criteria. As compensation for these services, Tronox receives a monthly management fee of approximately $1 million, which is recorded in "Other income, net" within the Consolidated Statement of Operations and in "Prepaid and other assets" on the Consolidated Balance Sheet. The monthly management fee is subject to certain success incentives if and when the Slagger achieves the Option Criteria. The term of the Amended TSA was extended in December 2021 until December 31, 2022. Tronox recorded approximately $8 million and $5 million in "Other Income" for this the management fee for the years ended December 31, 2021 and 2020, respectively, in the Consolidated Statement of Operations. At both December 31, 2021 and 2020, Tronox had a receivable due from AMIC related to management fee of $1 million that is recorded within "Prepaid and other assets" on the Consolidated Balance Sheet.

At December 31, 2021, Tronox had a receivable due from Tasnee of $8 million related primarily to $4 million of stamp duty taxes reimbursable from Tasnee and $3 million for pre-acquisition period tax settlements in process with certain tax authorities also reimbursable from Tasnee. At December 31, 2020, Tronox had a receivable due from Tasnee of $9 million related primarily to amounts arising from transition service agreements, stamp duty taxes paid on behalf of Tasnee, pre-acquisition activities and reimbursement of a tax settlement due to the Australian Taxation Office for pre-acquisition tax periods. These receivables are recorded within “Prepaid and other assets” on the Consolidated Balance Sheet.

On December 29, 2019, we entered into an agreement with Cristal to acquire certain assets co-located at our Yanbu facility which produce metal grade TiCl4 ("MGT"). Consideration for the acquisition is the assumption by Tronox of a $36 million note payable to Cristal (the "MGT Loan"). MGT is used at a titanium "sponge" plant facility, 65% of the ownership interests of which are held by Advanced Metal Industries Cluster and Toho Titanium Metal Co. Ltd ("ATTM"), a joint venture between AMIC and Toho Titanium Company Ltd. ATTM uses the TiCl4, which we supply by pipeline, for the production of titanium sponge, a precursor material used in the production of titanium metal.

On December 17, 2020 we completed the MGT transaction. Repayment of the $36 million note payable is based on a fixed U.S. dollar per metric ton quantity of MGT delivered by us to ATTM over time and therefore the ultimate maturity date is variable in nature. If ATTM fails to purchase MGT from us under certain contractually agreed upon conditions, then at our election we may terminate the MGT supply agreement with ATTM and will no longer owe any amount under the loan agreement with Cristal. We currently estimate the ultimate maturity to be between approximately five and six years, subject to actual future MGT production levels. The interest rate on the note payable is based on the SAIBOR plus a premium. As of December 31, 2021, the outstanding balance of the note payable was $33 million, of which $7 million is expected to be paid within the next twelve months. During the year ended December 31, 2021 and 2020, Tronox recorded interest expense of $1 million and nil, respectively, related to the MGT Loan, which is recorded in "Interest expense" on the Consolidated Statement of Operations. During the year ended December 31, 2021 and 2020, Tronox recorded $4 million and nil, respectively, for MGT Loan repayments to Cristal that is recorded within "Net sales" on the Consolidated Statement of Operations.

As a result of these transactions we have entered into related to the MGT assets, Tronox recorded $8 million and $5 million for purchase of chlorine gas for the years ended December 31, 2021 and 2020, respectively, from ATTM and such amounts are recorded in "Cost of goods sold" on the Consolidated Statement of Operations. The amount due to ATTM as of December 31, 2021 and 2020, for the purchase of chlorine gas was $1 million and $3 million, respectively, and is recorded within “Accrued liabilities” on the Consolidated Balance Sheet.

During the year ended December 31, 2021 and 2020, Tronox recorded $31 million and $25 million, respectively, for MGT sales made to AMIC. The MGT sales are recorded in “Net sales” on the Consolidated Statement of Operations. At December 31, 2021 and December 31, 2020, Tronox had a receivable from AMIC of $6 million and $7 million, respectively, from MGT sales that is recorded within “Prepaid and other assets” on the Consolidated Balance Sheet.

25. Segment Information

We operate our business under one operating segment, Tronox, which is also our reportable segment. The Company's chief operating decision maker, who are its Co-CEOs, reviews financial information presented at the consolidated level for purposes of allocating resources and evaluating financial performance. Since we operate our business under one segment, there is no difference between our consolidated results and segment results.

We disaggregate revenue from contracts with customers by product type and geographic area as well as sales based on country of production. We believe this level of disaggregation appropriately depicts how the nature, amount, timing and uncertainty of our revenue and cash flows are affected by economic factors and reflects how our business is managed.

During 2021, 2020 and 2019 our ten largest third-party customers represented 28%, 32%, and 31%, respectively, of our consolidated net sales. During 2021, 2020, and 2019, no single customer accounted for 10 % of our consolidated net sales.

Net sales to external customers based on country of production, were as follows:

	Year Ended December 31,		
	2021	2020	2019
U.S. operations	$ 716	$ 653	$ 676
International operations:			
United Kingdom	396	301	218
Australia	873	637	674
South Africa	441	330	370
Saudi Arabia	420	269	218
Other - international	726	568	486
Total net sales	$ 3,572	$ 2,758	$ 2,642

See Note 5 for further information on revenues.

There is no difference between the total consolidated assets of continuing operations and our segment assets. Property, plant and equipment, net, mineral leaseholds, net, and lease right of use assets, net by geographic region, were as follows:

	December 31,	
	2021	2020
U.S. operations	$ 251	$ 261
International operations:		
United Kingdom	97	101
Saudi Arabia	241	262
South Africa	705	768
Australia	1,000	995
Other - international	248	256
Total	$ 2,542	$ 2,643

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

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Under the supervision of and with the participation of Tronox's management, including our Co-CEOs and CFO, we evaluated the effectiveness of the design and operation of our disclosure controls and procedures (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended) (the "Exchange Act"), as of December 31, 2021, the end of the period covered by this report. Based on that evaluation, our co-CEOs and CFO have concluded that the Company's disclosure controls and procedures were effective as of that date. Tronox's disclosure controls and procedures are designed to ensure that information required to be disclosed by Tronox in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Commission's rules and forms, and that such information is accumulated and communicated to Tronox's management, including Tronox's co-CEOs and CFO, or other person performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

Management's Report on Internal Control Over Financial Reporting

Management of Tronox Holdings plc and its subsidiaries is responsible for establishing and maintaining adequate internal control over financial reporting. Internal controls over financial reporting is a process designed under the supervision of our interim principal co-executive officers and principal financial officer to provide reasonable assurance regarding the reliability of financial reporting and the preparation of the Company's financial statements for external purposes in accordance with U.S. generally accepted accounting principles.

Our internal controls over financial reporting include those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with U.S. generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of the Company's management and directors; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements.

Management assessed the effectiveness of our internal controls over financial reporting as of December 31, 2021. In making this assessment, management used the criteria in *Internal Control-Integrated Framework* (2013) set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on our assessment using those criteria, management concluded that our internal control over financial reporting as of December 31, 2021 was effective.

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

The effectiveness of the Company's internal control over financial reporting as of December 31, 2021 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which appears in Item 8 of this Form 10-K.

Changes in Internal Control Over Financial Reporting

There have been no changes to our internal control over financial reporting during the quarter ended December 31, 2021 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Information about our executive officers as of February 22, 2022:

NAME	POSITION
John D. Romano	Co-Chief Executive Officer
Jean-Francois Turgeon	Co-Chief Executive Officer
Timothy Carlson	Senior Vice President, Chief Financial Officer
Jeff Engle	Senior Vice President, Commercial and Strategy
Russell Austin	Senior Vice President, Operations
Jeffrey Neuman	Senior Vice President, General Counsel and Secretary
D. John Srivisal	Senior Vice President, Business Development and Finance
Melissa Zona	Senior Vice President, External Affairs and Chief Sustainability Officer
Jennifer Guenther	Vice President, Head of Investor Relations
Jonathan P. Flood	Vice President, Controller and Principal Accounting Officer

Information about members of our Board of Directors as of February 22, 2022:

NAME	CURRENT OCCUPATION
Ilan Kaufthal	Chairman of the Board, Tronox Holdings plc; Eastwind Advisors
Mutlaq Al-Morished	CEO, TASNEE
Vanessa Guthrie	Former Managing Director and Chief Executive Officer, Toro Energy Limited
Peter B. Johnston	Former Interim CEO, Tronox Limited; Former Global Head of Nickel Assets, Glencore
Ginger M. Jones	Former Senior Vice President and CFO, Cooper Tire & Rubber Company
Stephen Jones	Former President and CEO, Covanta Holding Corporation
Moazzam Khan	Managing Director, Cristal International Holdings BV
Sipho Nkosi	Former CEO, Exxaro Resources Limited
John Romano	Co-Chief Executive Officer, Tronox
Jean-Francois Turgeon	Co-Chief Executive Officer, Tronox

Other information regarding our executive officers, members of the Board of Directors, including its audit committee and audit committee financial experts, as well as information regarding our Code of Ethics and Business Conduct that applies to our co-Chief Executive Officers and senior financial officers, will be presented in Tronox Holding plc's definitive proxy statement for its 2022 annual general meeting of shareholders, which will be filed not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, under the headings "Proposal 1 - Election of Directors" and "Code of Ethics and Business Conduct" and is incorporated herein by reference.

Item 11. Executive Compensation

Information regarding executive officer and director compensation will be presented in Tronox Holdings plc's definitive proxy statement for its 2022 annual general meeting of shareholders, filed not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, under the headings "Human Resources and Compensation Committee Interlocks and Insider Participation", "2021 Non-Employee Director Compensation" and "Compensation Discussion and Analysis" and is incorporated herein by reference.

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

Information regarding security ownership of certain beneficial owners and management and related shareholder matters will be presented in Tronox Holdings plc's definitive proxy statement for its 2022 annual general meeting of shareholders, filed not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, under the heading "Security Ownership of Certain Beneficial Owners" and is incorporated herein by reference.

Equity Compensation Plan Information

The following table provides information as of December 31, 2021 regarding securities issued under the Tronox Holdings plc Amended and Restated Management Equity Incentive Plan (the "Tronox Holdings plc MEIP").

	Number of securities to be issued upon exercise of outstanding restricted share units and options	Weighted-average exercise price of outstanding options[1]	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in the second column)[2]
Equity compensation plans approved by security holders	5,871,272	$ 22.13	8,129,023
Equity compensation plans not approved by security holders	—	—	—
Total	5,871,272	$ 22.13	8,129,023

(1) Because there is no exercise price for restricted share units, such awards are not included in the weighted-average exercise price.

(2) Each restricted share unit awarded under the Tronox Holdings plc MEIP was granted at no cost to the persons receiving them and represents the contingent right to receive the equivalent number of ordinary shares.

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

Information regarding certain relationships and related transactions and director independence will be presented in Tronox Holdings plc's definitive proxy statement for its 2022 annual general meeting of shareholders, filed not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, under the heading "Certain Relationships and Related Transactions" and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

Information regarding principal accounting fees and services will be presented in Tronox Holdings plc's definitive proxy statement for its 2022 annual general meeting of shareholders, filed not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, under the heading "Fees Paid to Independent Registered Public Accounting Firm" and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) The following documents are filed as part of this Annual Report on Form 10-K:

1. Consolidated Financial Statements

Reference is made to the Index to Consolidated Financial Statements and Consolidated Financial Statement Schedules appearing at "Item 8. Financial Statements and Supplementary Data" in this report.

2. Consolidated Financial Statement Schedules

All financial statement schedules are omitted as they are inapplicable, or the required information has been included in the consolidated financial statements or notes thereto.

3. Exhibits

(b) The exhibits listed in the following table have been filed with, or incorporated by reference into, this Annual Report on Form 10-K.

2.1	Transaction Agreement, dated as of February 21, 2017, by and between Cristal, Tronox Limited and Cristal Inorganic Chemicals Netherlands Coöperatief W.A. (incorporated by reference to Exhibit 2.1 of the Current Report on Form 8-K filed on February 21, 2017).
2.2	Amendment No. 1 to Transaction Agreement, dated as of March 1, 2018, by and among The National Titanium Dioxide Company Limited, Tronox Limited and Cristal Inorganic Chemicals Netherlands Coöperatief W.A. (incorporated by reference to Exhibit 2.1 of the Current Report on Form 8-K filed on March 1, 2018).
2.3	Amendment No. 2 to Transaction Agreement dated March 28, 2019, by and among The National Titanium Dioxide Company Limited, Tronox Limited, and, solely for certain purposes, Cristal Inorganic Chemicals Netherlands Coöperatief W.A. (incorporated by reference to Exhibit 2.1 of the Current Report on Form 8-K filed on April 2, 2019).
2.4	Stock Purchase Agreement, dated as of March 14, 2019, by and among Tronox Limited, INEOS AG and INEOS Joliet US Holdco, LLC (incorporated by reference to Exhibit 2.1 of the Current Report on Form 8-K filed on March 19, 2019).
2.5	Agreement for the sale and purchase of Tizir Titanium & Iron AS, dated as of May 14, 2020, by and between Tronox Holdings plc, Tronox Titanium Holdings AS, Tizir Limited and Eramet S.A. (incorporated by reference to Exhibit 2.1 of the Current Report on Form 8-K/A filed on May 14, 2020)
3.1	Articles of Association of Tronox Holdings plc (incorporated by reference to Exhibit 3.1 of the Current Report on Form 8-K filed on March 27, 2019).
4.1	Specimen ordinary share certificate of Tronox Holdings plc (incorporated by reference to Exhibit 4.1 of the Current Report on Form 8-K filed on March 27, 2019).
4.2	Shareholders Agreement, dated April 10, 2019, by and between Tronox Holdings plc, Cristal Inorganic Chemicals Netherlands Coöperatief W.A., The National Titanium Dioxide Company Limited, Gulf Investment Corporation and Dr. Talal Al-Shair (incorporated by reference to Exhibit 4.1 of the Current Report on Form 8-K filed on April 11, 2019).
4.3	Description of Securities of the Registrant (filed herewith).
4.4	Indenture, dated as of May 1, 2020 among Tronox Incorporated, the Company and the other guarantors named therein and Wilmington Trust, National Association, as trustee (incorporated by reference to Exhibit 4.1 of the Current Report on Form 8-K filed on May 1, 2020).
4.5*	Indenture, dated as of March 15, 2021, among Tronox Incorporated, Tronox Holdings plc and the guarantors named therein and Wilmington Trust, National Association, as trustee (incorporated by reference to Exhibit 4.1 of the Current Report on Form 8-K filed on March 15, 2021).
10.1*	Tronox Holdings plc Amended and Restated Management Equity Incentive Plan (incorporated by reference to Exhibit 10.2 of the Current Report on Form 8-K filed on March 27, 2019).
10.2*	Tronox Holdings plc Amended and Restated Annual Bonus Incentive Plan (incorporated by reference to Exhibit 10.3 of the Current Report on Form 8-K filed on March 27, 2019).
10.3*	Offer letter, dated November 7, 2019 by and between Tronox Holdings plc and Timothy Carlson (incorporated by reference to Exhibit 10.1 to the Quarterly Report on Form 10-Q filed on November 12, 2019).
10.4*	General form of executive officer Time-Based Restricted Share Unit Agreement (filed herewith).
10.5*	General form of executive officer TSR Performance-Based Restricted Share Unit Agreement (filed herewith).
10.6*	General form of executive officer ROIC Performance-Based Restricted Share Unit Agreement (filed herewith).
10.7*	General form of Director Grant Restricted Share Unit Agreement (incorporated by reference to Exhibit 10.3 to the Quarterly Report on Form 10-Q filed on May 4, 2017).
10.8	Form of Director Deed of Indemnification (incorporated by reference to Exhibit 10.4 of the Current Report on Form 8-K filed on March 27, 2019).

10.9	Agreement for the Provision of Depositary Services and Custody Services, dated as of April 10, 2019, in respect of Tronox Holdings plc Depositary Receipts among Computershare Trust Company, N.A., Tronox Holdings plc, Cristal Inorganic Chemicals Netherlands Coöperatief W.A. and all other holders from time to time of depositary receipts issued in accordance herewith (incorporated by reference to Exhibit 10.1 of the Current Report on Form 8-K filed on April 15, 2019).
10.10	Underwriting Agreement, dated February 24, 2021, by and among the Company, Exxaro Resources Limited and J.P. Morgan Securities LLC, as representative of the several underwriters named therein (incorporated by reference to Exhibit 1.1 of the Current Report on Form 8-K filed on March 1, 2021).
10.11	Amended and Restated First Lien Credit Agreement dated as of September 22, 2017 (as amended through and including Mach 11, 2021) with a syndicate of lenders and HSBC Bank USA, National Association, as administrative agent and collateral agent (incorporated by reference to Exhibit 10.1 of the Current Report on Form 8-K filed on March 11, 2021).
10.12*	Retirement Agreement dated as of March 18, 2021 by and between the Company and Mr. Jeffry N. Quinn (incorporated by reference to Exhibit 10.1 of the Current Report on Form 8-K filed on March 18, 2021).
10.13*	Employment Agreement dated as of March 18, 2021 by and between the Company and Mr. John D. Romano (incorporated by reference to Exhibit 10.2 of the Current Report on Form 8-K filed on March 18, 2021).
10.14*	Employment Agreement dated as of March 18, 2021 by and between the Company and Mr. Jean-Francois Turgeon (incorporated by reference to Exhibit 10.3 of the Current Report on Form 8-K filed on March 18, 2021).
14.1	Tronox Code of Ethics and Business Conduct, effective March 27, 2019 (incorporated by reference to Exhibit 14.1 of the Annual Report on Form 10-K filed on March 16, 2020).
21.1	Subsidiaries of Tronox Holdings plc. (filed herewith)
23.1	Consent of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm for Tronox Holdings plc. (furnished herewith)
24.0	Power of Attorney (filed herewith)
31.1	Rule 13a-14(a) Certification of John Romano. (furnished herewith)
31.2	Rule 13a-14(a) Certification of Jean-Francois Turgeon. (furnished herewith)
31.3	Rule 13a-14(a) Certification of Timothy Carlson. (furnished herewith)
32.1	Section 1350 Certification for John Romano. (furnished herewith)
32.2	Section 1350 Certification for Jean-Francois Turgeon. (furnished herewith)
32.3	Section 1350 Certification for Timothy Carlson. (furnished herewith)
96.1	Technical Report Summary on the Cooljarloo Australia operations (filed herewith).
96.2	Technical Report Summary on the Atlas and Campaspe Australia operations (filed herewith).
96.3	Technical Report Summary on the Namakwa Sands South Africa operations (filed herewith).
96.4	Technical Report Summary on the KZN Mineral Sands South Africa operations (filed herewith).
101.INS	Inline XBRL Instance Document (filed herewith)
101.SCH	Inline XBRL Taxonomy Extension Schema Document (filed herewith)
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document (filed herewith)
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document (filed herewith)
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document (filed herewith)
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document (filed herewith)
104	The cover page from the Company's Annual Report on Form 10-K for the year ended December 31, 2021, which has been formatted in Inline XBRL, and included with Exhibit 101.

* Indicates management contract or compensatory plan or arrangement.

Item 16. Form 10-K Summary.

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, on this 22nd day of February 2022.

TRONOX HOLDINGS PLC
(Registrant)

By:	/s/ Jonathan P. Flood
Name:	Jonathan P. Flood
Title:	Vice President, Controller and Principal Accounting Officer

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

Signature	Title	Date
/s/ John Romano John Romano	Co-Chief Executive Officer, Director (Principal Executive Officer)	February 22, 2022
/s/ Jean-Francois Turgeon Jean-Francois Turgeon	Co-Chief Executive Officer, Director (Principal Executive Officer)	February 22, 2022
/s/ Timothy Carlson Timothy Carlson	Senior Vice President and Chief Financial Officer (Principal Financial Officer)	February 22, 2022
/s/ Jonathan P. Flood Jonathan P. Flood	Vice President and Controller (Principal Accounting Officer)	February 22, 2022
* Ilan Kaufthal	Chairman of the Board of Directors	February 22, 2022
* Mutlaq Al-Morished	Director	February 22, 2022
* Vanessa Guthrie	Director	February 22, 2022
* Stephen Jones	Director	February 22, 2022
* Moazzam Khan	Director	February 22, 2022
* Peter B. Johnston	Director	February 22, 2022
* Sipho Nkosi	Director	February 22, 2022
* Ginger M. Jones	Director	February 22, 2022
*By: /s/ Jeffrey Neuman Jeffrey Neuman, Attorney-in-fact	Senior Vice President, General Counsel and Secretary	February 22, 2022

Exhibit 4.3

DESCRIPTION OF THE REGISTRANT'S SECURITIES REGISTERED PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

As of December 31, 2021, Tronox Holdings plc ("Tronox Holdings" or the "Company") had one class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"): our ordinary shares.

Description of Ordinary Shares

The following description of our ordinary shares, nominal value US$0.01 per share, is a summary and does not purport to be complete. It is subject to and qualified in its entirety by reference to the applicable laws of England and Wales, the applicable provisions of the UK Companies Act 2006 (the "UK Companies Act") and our Articles of Association (the "Articles of Association"), which is incorporated by reference as an exhibit to the Annual Report on Form 10-K of which this Exhibit 4.3 is a part. We encourage you to read our Articles of Association and the applicable provisions of the UK Companies Act for additional information.

General

As of the date of this filing, we are authorized to issue up to 500 million of our ordinary shares. Computershare Trust Company, N.A. is the transfer agent and registrar for our ordinary shares, which are listed on the New York Stock Exchange under the symbol "TROX."

Dividends and Distributions

Subject to the UK Companies Act, shareholders may declare dividends by ordinary resolution (but no dividend shall exceed any dividend recommended by the Board). The Board may also pay dividends to shareholders in accordance with their respective rights and interests in the Company. Dividends may be paid only out of "distributable reserves," defined as "accumulated, realized profits, so far as not previously utilized by distribution or capitalization, less accumulated, realized losses, so far as not previously written off in a reduction or reorganization of capital." The Company is not permitted to pay dividends out of share capital, which includes share premiums. Realized reserves are determined by reference to qualifying accounts of the Company meeting certain prescribed contents requirements and in accordance with generally accepted accounting principles. The Company will not be permitted to make a distribution if, at the time, the amount of its net assets is less than the aggregate of its issued and paid-up share capital and undistributable reserves or to the extent that the distribution will reduce the net assets below such amount. The Company is undertaking a reduction of capital with the aim of ensuring that sufficient distributable reserves will be available to permit dividends, distributions or share repurchases.

There are no fixed dates on which entitlement to dividends arise on any of the ordinary shares.

A general meeting declaring a dividend may, upon the recommendation of the Board, by ordinary resolution direct that it be satisfied wholly or partly by the distribution of assets, including shares or securities in any company. The Articles of Association also permit a scrip dividend scheme under which the Board may allot to

holders of ordinary shares who have elected to receive them, further ordinary shares, credited as fully paid, instead of cash in respect of all or part of a dividend. Unclaimed dividends and other amounts payable by the Company can be invested or otherwise used by the Board for the benefit of the Company until they are claimed or disposed of in accordance with any applicable law relating to unclaimed monies.

Conversion, Redemption and Residency

There are no conversion rights or redemption provisions relating to the ordinary shares. Under the laws of England and Wales, persons who are neither residents nor nationals of the UK may freely hold, vote and transfer the ordinary shares in the same manner and under the same terms as UK residents or nationals.

Voting Rights

The Articles of Association provide that, for so long as any shares are held by a Depositary (as defined in the Articles of Association), a resolution put to the vote at a general meeting shall be decided on a poll. Subject to the UK Companies Act and to any rights or restrictions as to voting attached to any class of shares, every shareholder present and entitled to vote on the resolution has one vote for every ordinary share of which he, she or it is the holder. In the case of joint holders of an ordinary share, the vote of the senior holder (determined by the order of the joint holders' names on the register) who votes (or any proxy duly appointed by the senior holder) shall be accepted to the exclusion of the votes of the other joint holders.

Amendment to the Articles of Association

Under the laws of England and Wales, and subject to a quorum being present, the shareholders may amend the articles of association of the Company by special resolution (i.e., a resolution approved by the holders of at least 75% of the aggregate voting power of the outstanding ordinary shares that, being entitled to vote, vote on the resolution) at a general meeting. The full text of the special resolution must be included in the notice of the meeting.

Winding Up

In the event of a voluntary winding up of the Company, the liquidator may, with the sanction of a special resolution of the Company and any other sanction required by law, divide among the shareholders the whole or any part of the assets of the Company and vest the whole or any part of the assets in trustees upon such trusts for the benefit of the members as the liquidator, with the like sanction, will determine. Upon any such winding up, after payment or provision for payment of the Company's debts and liabilities, the holders of ordinary shares (and any other shares in issue at the relevant time which rank equally with such shares) will share equally, on a share for share basis, in the Company's assets remaining for distribution to the holders of ordinary shares.

Pre-emptive Rights and New Issues of ordinary shares

Under the laws of England and Wales, the Board is, with certain exceptions, unable to allot and issue securities without being authorized by the shareholders in a general meeting. In addition, the laws of England and

Wales require that any issuance of equity securities that are to be paid for wholly in cash must be offered first to the existing holders of equity securities in proportion to the respective nominal amounts (i.e., par values) of their holdings on the same or more favorable terms, unless a special resolution (i.e., a resolution approved by the holders of at least 75% of the aggregate voting power of the outstanding ordinary shares that, being entitled to vote, vote on the resolution) excluding this requirement has been passed in a general meeting of shareholders (which authority can be for a maximum of five years, after which a further shareholder approval would be required to renew the exclusion). In this context, equity securities generally means shares other than shares which, with respect to dividends or capital, carry a right to participate only up to a specified amount in a distribution, which, in relation to the Company, will include the ordinary shares and all rights to subscribe for or convert securities into such shares.

The directors of the Company have been authorized by way of a shareholder resolution passed at a general meeting of the Company held on February 25, 2019, for a period of five years, to allot shares in the Company, or to grant rights to subscribe for or to convert or exchange any security into shares in the Company, up to an aggregate nominal amount (i.e., par value) of US$5,000,000 and pre-emption rights in respect of such allotments have also been excluded.

The laws of England and Wales also prohibit an English company from issuing shares at a discount to nominal amount (i.e., par value) or for no consideration. If the shares are issued upon the lapse of restrictions or the vesting of any restricted stock award or any other share-based grant underlying any ordinary shares, the nominal amount (i.e., par value) of the shares must be paid up in accordance with the laws of England and Wales.

Shareholder Rights Plan

Under the Articles of Association, a shareholder rights plan may be established to prevent an "ownership change" for the purpose of section 382 of the US Internal Revenue Code of 1986, as amended ("section 382"). The purpose of any rights plan will be to preserve the Company's ability to utilize its net operating loss carry forwards and other tax attributes, which would be substantially limited if the Company experienced an "ownership change" as defined under section 382. In general, an ownership change would occur under section 382 if the shareholders who are treated as owning 5% or more of ordinary shares for the purposes of section 382 collectively increased their aggregate ownership in ordinary shares by more than 50% over a rolling three-year period.

Effective from the date that a rights plan is introduced, the Board will grant subscription rights to holders of ordinary shares to acquire ordinary shares (or shares of any class as specified in the rights plan) such that, if any person or group acquires 4.5% or more of the ordinary shares, or if a person or group that owns 4.5% or more of ordinary shares acquires additional ordinary shares representing 0.5% or more of the issued ordinary shares, then, subject to certain exceptions, there would be a triggering event under the rights plan. The rights would then separate from the ordinary shares and would be adjusted to become exercisable so that ordinary shares (or shares of any class as specified in the rights plan) could be acquired by all holders of ordinary shares (other than the person or group that caused the trigger event). The shares to be acquired would have a market value equal to twice the exercise price, resulting in significant dilution in the ownership interest of the person or group that caused the trigger event.

If a rights plan is established, the Board will have the discretion to exempt any acquisition of ordinary shares from the provisions of the rights plan if it determines that doing so would not jeopardize or endanger the

Company's use of its net operating losses. The Board will also have the ability to terminate any rights plan prior to a triggering event, including, but not limited to, in connection with a transaction.

Rights issued under a rights plan are expected to expire five years after the date on which any rights plan is established.

Disclosure of Interests in Shares

The laws of England and Wales give the Company the power to serve a notice requiring any person whom it knows has, or whom it has reasonable cause to believe has, or within the previous three years has had, any ownership interest in any ordinary shares to disclose specified information regarding those shares. Failure to provide the information requested within the prescribed period (or knowingly or recklessly providing false information) after the date the notice is sent can result in criminal or civil sanctions being imposed against the person in default.

Under the Articles of Association, if any shareholder, or any other person appearing to be interested in ordinary shares held by such shareholder, fails to give the Company the information required by the notice, the Board may withdraw voting and certain other rights, and place restrictions on the rights to receive dividends and to transfer such ordinary shares.

Alteration of Share Capital; Repurchase of ordinary shares

Subject to the provisions of the UK Companies Act, and without prejudice to any relevant special rights attached to any class of shares, the Company may, from time to time:

- increase its share capital by allotting and issuing new shares in accordance with the Articles of Association and any relevant shareholder resolution;
- consolidate all or any of its share capital into shares of a larger nominal amount (i.e., par value) than the existing shares; or
- redenominate its share capital or any class of share capital.

The laws of England and Wales prohibit the Company from purchasing its own shares unless such purchase has been approved by its shareholders. Shareholders may approve two different types of such share purchases: "on-market" purchases or "off-market" purchases. "On-market" purchases may be made only on a "recognised investment exchange," which does not include the NYSE, which is the only exchange on which the Company's Shares are traded. In order to purchase its own shares, the Company must therefore obtain shareholder approval for "off-market" purchases. This requires that the Company's shareholders pass an ordinary resolution approving the terms of the contract pursuant to which any purchase is to be made. Such approval may be for a specific purchase or constitute a general authority lasting for up to five years after the date of the resolution, and renewal of such approval for additional five-year terms may be sought more frequently. However, shares may be repurchased only

out of distributable reserves or, subject to certain exceptions, the proceeds of a fresh issue of shares made for that purpose. At a general meeting of the Company held on February 25, 2019, shareholder resolutions were passed authorizing the Company to repurchase ordinary shares for a period of five years through (i) an approved form of share repurchase contract, or (ii) an approved form of share repurchase plan established in accordance with Rule 10b5-1 under the Exchange Act.

Transfer of ordinary shares

The Articles of Association allow holders of ordinary shares to transfer all or any of their ordinary shares in the case of ordinary shares held in certificated form by instrument of transfer in writing in any usual form or in any other form which is permitted by the UK Companies Act and is approved by the Board. The instrument of transfer must be executed by or on behalf of the transferor and (in the case of a transfer of a share which is not fully paid) by or on behalf of the transferee.

The Board may, in its absolute discretion, refuse to register a transfer of a certificated ordinary share to any person if it is not fully paid or is an ordinary share on which the Company has a lien. The Board may also refuse to register the transfer of a share in certain other limited circumstances, including if the transfer is not in favor of four or fewer transferees or it is in favor of a minor, bankrupt or person of mental ill health. If the Board refuses to register the transfer of a share, the instrument of transfer must be returned to the transferee within two months after the date on which the transfer was lodged with the Company with the notice of refusal and reasons for the refusal.

The Company's share register is maintained by its transfer agent, Computershare Trust Company, N.A. Registration in this share register is determinative of share ownership. A shareholder who holds ordinary shares through the DTC clearance system is not the holder of record of such shares. Instead, the depositary (for example, Cede & Co., as nominee for DTC) or other nominee is the holder of record of such shares. Accordingly, a transfer of shares from a person who holds such shares through the DTC clearance system to a person who also holds such shares through the DTC clearance system will not be registered in the Company's official share register, as the depositary or other nominee will remain the record holder of such shares.

Anti-Takeover Provisions

The UK City Code on Takeovers and Mergers (the "Takeover Code") applies, among other things, to an offer for a public company whose registered office is in the UK (or the Channel Islands or the Isle of Man) and whose securities are not admitted to trading on a regulated marked in the UK (or on any stock exchange in the Channel Islands or the Isle of Man) if the company is considered by the UK Panel on Takeovers and Mergers (the "Takeover Panel"), the regulatory body which issues and administers the Takeover Code, to have its place of central management and control in the UK (or the Channel Islands or the Isle of Man). This is known as the "residency test". Under the Takeover Code, the Takeover Panel will determine whether the Company has its place of central management and control in the UK by looking at various factors, including the structure of the Board, the functions of the directors and where they are resident.

If, at the time of a takeover offer, the Takeover Panel determines that the Company has its place of central management and control in the UK, the Company would be subject to a number of rules and restrictions, including but not limited to the following: (i) the ability of the Company to enter into deal protection arrangements with a bidder would be extremely limited; (ii) the Company might not, without the approval of its shareholders, be able to perform certain actions that could have the effect of frustrating an offer, such as issuing shares or carrying out acquisitions or disposals; and (iii) the Company would be obliged to provide equality of information to all bona fide competing bidders.

It is intended that all of the Company's directors will reside outside of the UK, the Channel Islands and the Isle of Man. Accordingly, for the purposes of the Takeover Code, the Company is expected to be considered to have its place of central management and control outside the UK, the Channel Islands or the Isle of Man. Therefore, the Takeover Code is not expected to apply to the Company. It is possible that in the future circumstances could change that may cause the Takeover Code to apply to the Company.

Although the Company is not expected to be subject to the Takeover Code, the Articles of Association incorporate the protections of mandatory offer provisions substantially similar to the Takeover Code. Except with the prior consent of the Board or the prior approval of independent shareholders, a shareholder, together with persons acting in concert with it, would be at risk of certain sanctions including disenfranchisement (as regards voting and entitlement to dividends) if they acquired an interest in ordinary shares carrying 30% or more of the voting rights of the Company without making an offer for all of the other issued ordinary shares in cash or accompanied by a cash alternative. These provisions could have the effect of discouraging the acquisition and holding of interests of 30% or more of the voting rights and encouraging those shareholders who may be acting in concert with respect to the acquisition of shares to consult with the Board before effecting any additional purchases.

The mandatory offer provisions in the Articles of Association only apply while the Takeover Code does not apply to the Company.

Exhibit 10.4

FORM OF
TIME-BASED RESTRICTED SHARE UNIT AGREEMENT
PURSUANT TO THE
AMENDED AND RESTATED
TRONOX HOLDINGS PLC
MANAGEMENT EQUITY INCENTIVE PLAN

* * * * *

Participant:

Grant Date:

Vest Dates:
1.
2.
3.

If any Vest Date is not a trading day on the NYSE, the Vest Date will be the next trading day.

Number of Restricted Share Units granted:

* * * * *

THIS RESTRICTED SHARE UNIT AWARD AGREEMENT (this "Agreement"), dated as of the Grant Date specified above, is entered into by and between Tronox Holdings plc (the "Company"), and the Participant specified above, pursuant to the Amended and Restated Tronox Holdings plc Management Equity Incentive Plan (the "Plan"), which is administered by the Committee; and

WHEREAS, it has been determined by the Committee under the Plan that it would be in the best interests of the Company to grant and issue the Restricted Share Units provided herein to the Participant on and subject to the terms and conditions of the Plan and this Agreement ("Time RSUs").

NOW, THEREFORE, in consideration of the mutual covenants and promises hereinafter set forth and for other good and valuable consideration, the parties hereto hereby mutually covenant and agree as follows:

1. **Incorporation By Reference; Plan Document Receipt Certain Defined Terms**. This Agreement is an Award Agreement for the purpose of the Plan. This Agreement is subject in all respects to the terms and provisions of the Plan (including, without limitation, any amendments thereto adopted at any time and from time to time unless such amendments are expressly intended not to apply to the Award provided hereunder), all of which terms and provisions are made a part of and incorporated in this Agreement as if they were each expressly set forth herein. Any capitalized term not defined in this Agreement shall have the same meaning as is ascribed thereto in the Plan. The Participant hereby acknowledges receipt of a true copy of the Plan and that the Participant has read the Plan carefully and fully understands its content. Unless otherwise provided herein, in the event of any conflict between the terms of this Agreement and the terms of the Plan, the terms of the Plan shall control.

2. **Grant of Restricted Share Unit Award**. The Company hereby grants to the Participant on or as soon as practicable after the date of execution of this Agreement the number of Time RSUs specified above. The Participant agrees and understands that except as provided

by the Plan nothing contained in this Agreement provides, or is intended to provide, the Participant with any protection against potential future dilution of the Participant's interest in the Company for any reason and no adjustments shall be made for dividends in cash or other property, distributions or other rights in respect of any such shares, except as otherwise specifically provided for in the Plan or this Agreement. The Participant also agrees and understands that the Time RSUs are not Shares and do not confer rights on the Participant as a Shareholder.

3. **Vesting**.

(a) General. Except as otherwise provided in this Section 3, the Time RSUs subject to this Agreement shall vest in three equal annual installments with one installment vesting on each Vest Date, provided that the Participant has at all times during the period commencing on the Grant Date and ending on each such Vest Date, respectively, been employed by the Company or one of its Subsidiaries.

(b) Termination in General. Except as otherwise set forth in Sections 3(c), 3(d), 3(e), 3(f), and 3(g) hereof, all unvested Time RSUs shall immediately be canceled and forfeited upon a Termination for any reason.

(c) Termination for Death or Disability. Upon a Participant's Termination due to the Participant's death or Disability, all unvested Time RSUs shall immediately become vested upon the date of such Termination.

(d) Termination for Normal Retirement. Upon a Participant's Termination due to the Participant's Normal Retirement prior to the first Vest Date, the number of Time RSUs subject to this Agreement scheduled to vest on the first Vest Date shall immediately become vested upon the date of such Termination and all other unvested Time RSUs subject to this Agreement shall immediately be canceled and forfeited upon Termination. Upon a Participant's Termination due to the Participant's Normal Retirement on or after the first Vest Date, all unvested Time RSUs subject to this Agreement shall immediately become vested upon the date of such Termination. For purposes of this Agreement, "Retirement" shall mean a Termination other than a termination for Cause at or after age 65 or such earlier date after age 50 as may be approved by the Committee with regard to such Participant, in its sole discretion, subject to Section 409A of the Code.

(e) Termination without Cause. Upon a Participant's Termination by the Company without Cause, a pro rata portion of the unvested Time RSUs that would have become vested on the Vest Date following the date of such Termination shall become vested in an amount determined by multiplying the number of Time RSUs that were eligible to become vested on the Vest Date following the date of such Termination by a fraction, the numerator of which is the number of calendar days from the Vest Date immediately preceding the date of Termination to the date of Termination and the denominator of which is the number of calendar days from the Vest Date immediately preceding the date of Termination to the next Vest Date after the date of such Termination. If the Participant's date of Termination is prior to the first Vest Date, a pro rata portion of the unvested Time RSUs that would have become vested on the first Vest Date shall become vested in an amount determined by multiplying the number of Time RSUs that were eligible to become vested on the first Vest Date by a fraction, the numerator of which is the number of calendar days from the Grant Date to the date of Termination and the denominator of which is the number of calendar days from the Grant Date to the first Vest Date.

(f) Change in Control. Except as otherwise provided in a Participant's employment agreement, if any, Section 12.1 of the Plan shall govern the treatment of the Time RSUs in connection with a Change in Control.

(g) Committee Discretion to Accelerate Vesting. Notwithstanding the foregoing, the Committee may, in its sole discretion (but subject to applicable law), provide for accelerated vesting of the Time RSUs at any time and for any reason.

4. **Delivery of Unrestricted Shares**. If and when Time RSUs awarded by this Agreement become vested, the Units shall cease to be liable to be forfeited by the Participant. By no later than ten (10) days following the date on which any Time RSUs awarded hereunder become vested the Company, subject to satisfaction of the tax withholding requirements under Section 10 below, shall (i) deliver to the Participant a certificate or book-entry transfer for a number of unrestricted Shares equal to the total number of Time RSUs that vested on such date and (ii) make a Dividend Equivalent Payment to the Participant with respect to such Time RSUs as provided in Section 7.5.5(b) of the Plan.

5. **Dividends and Other Distributions; Voting Rights**.

(a) Section 7.5.5(b) of the Plan shall apply with respect to the Time RSUs.

(b) Participants have no voting rights during period of restrictions for Time RSUs.

(c) Section 7.5.6 of the Plan shall apply with respect to the Time RSUs (unless the Committee determines otherwise in any particular case pursuant to Section 4.3 of the Plan).

6. **No transferability**. No Time RSUs granted hereunder may be sold, transferred, pledged, assigned or otherwise alienated or hypothecated.

7. **Entire Agreement; Amendment**. This Agreement, together with the Plan, contains the entire agreement between the parties hereto with respect to the subject matter contained herein, and supersedes all prior agreements or prior understandings, whether written or oral, between the parties relating to such subject matter. The Committee shall have the right, in its sole discretion, to modify or amend this Agreement from time to time in accordance with and as provided in the Plan. This Agreement may also be modified or amended by writing signed by both the Company and the Participant. The Company shall give written notice to the Participant of any such modification or amendment of this Agreement as soon as practicable after the adoption thereof.

8. **Acknowledgment of Participant**. This award of Time RSUs does not entitle Participant to any benefit other than that granted under this Agreement. Any benefits granted under this Agreement are not part of the Participant's ordinary salary, and shall not be considered as part of such salary in the event of severance, redundancy or resignation. Participant understands and accepts that the benefits granted under this Agreement are entirely at the discretion of the Company and that the Company retains the right to amend or terminate this Agreement and the Plan at any time, at its sole discretion and without notice.

9. **Governing Law**. This Agreement shall be governed by and construed in accordance with the laws of the State of New York, without reference to the principles of conflict of laws thereof.

10. **Withholding of Tax**. As a condition to the distribution of Shares to the Participant, the Participant shall be required to pay in cash, or to make other arrangements satisfactory to the Company (including, without limitation, authorizing withholding from payroll and any other amounts payable to the Participant), the amount that is sufficient to satisfy any federal, provincial, state, local and foreign taxes of any kind (including, but not limited to, the Participant's FICA and SDI obligations) in any and all jurisdictions which the Company, in its sole discretion, deems necessary to comply with the Code and/or any other applicable law, rule or regulation with respect to the Time RSUs. Unless the tax withholding obligations of the Company are satisfied, the Company shall have no obligation to issue a certificate or book-entry transfer for such Shares (except as required by applicable law). The Committee, in its sole discretion and pursuant to such procedures as it may specify from time to time, may permit the Participant to satisfy his or her tax obligations, in whole or in part by one or more of the following (without limitation): (a) paying cash, (b) electing to have the Company withhold otherwise deliverable Shares having a Fair Market Value equal to the amount required to be withheld or (c) selling a sufficient number of such Shares otherwise deliverable to Participant through such means as the Company may determine in its sole discretion (whether through a broker or otherwise) equal to the amount required to be withheld.

11. **Acceptance**. The Participant shall forfeit the Time RSUs if the Participant does not execute this Agreement within a period of sixty (60) days from the date that the Participant receives this Agreement (or such other period as the Committee shall provide). The Participant consents to receive such documents by electronic delivery through an on-line or electronic system established and maintained by the Company or another third party designated by the Company, including the acceptance of the Award and the execution of this Agreement through electronic signature, and participant agrees to be bound by such electronic acceptance and such electronic signature.

12. **Securities Representations**. The Time RSUs are being issued to the Participant and this Agreement is being made by the Company in reliance upon the following express representations and warranties of the Participant. The Participant acknowledges, represents and warrants that:

(a) The Participant has been advised that the Participant may be an "affiliate" within the meaning of Rule 144 under the Securities Act and in this connection the Company is relying in part on the Participant's representations set forth in this Section 12.

(b) If the Participant is deemed an affiliate within the meaning of Rule 144 of the Securities Act, the Time RSUs must be held indefinitely unless an exemption from any applicable resale restrictions is available or the Company files an additional registration statement (or a "re-offer prospectus") with regard to the Time RSUs and the Company is under no obligation to register the Time RSUs (or to file a "re-offer prospectus").

(c) If the Participant is deemed an affiliate within the meaning of Rule 144 of the Securities Act, the Participant understands that (i) the exemption from registration under Rule 144 will not be available unless (A) a public trading market then exists for the Shares of the Company, (B) adequate information concerning the Company is then available to the public, and (C) other terms and conditions of Rule 144 or any exemption therefrom are complied with, and (ii) any sale of the vested Time RSUs hereunder may be made only in limited amounts in accordance with the terms and conditions of Rule 144 or any exemption therefrom.

13. **No Right to Employment**. Any questions as to whether and when there has been a termination of such employment and the cause of such termination shall be determined in the sole discretion of the Committee. Nothing in this Agreement shall interfere with or limit in any

way the right of the Company to terminate the Participant's employment or service at any time, for any reason and with or without cause.

14. **Notices**. Any notice which may be required or permitted under this Agreement shall be in writing, and shall be delivered in person or via facsimile transmission, overnight courier service or certified mail, return receipt requested, postage prepaid, properly addressed as follows:

(a) If such notice is to the Company, to the attention of the General Counsel of the Company or Secretary of the Company at such other address as the Company, by notice to the Participant, shall designate in writing from time to time.

(b) If such notice is to the Participant, at his/her address as shown on the Company's records, or at such other address as the Participant, by notice to the Company, shall designate in writing from time to time.

15. **Compliance with Laws**. The issuance of the Time RSUs pursuant to this Agreement shall be subject to, and shall comply with, any applicable requirements of any foreign and U.S. federal and state securities laws, rules and regulations (including, without limitation, the provisions of the Securities Act, the Exchange Act, the Corporations Act, and in each case any respective rules and regulations promulgated thereunder) and any other law or regulation applicable thereto. The Company shall not be obligated to issue the Time RSUs or any of the Shares pursuant to this Agreement if any such issuance would violate any such requirements.

16. **Binding Agreement; Assignment**. This Agreement shall inure to the benefit of, be binding upon, and be enforceable by the Company and its successors and assigns. The Participant shall not assign (except as provided by Section 6 hereof) any part of this Agreement without the prior express written consent of the Company.

17. **Counterparts**. This Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original, but all of which shall constitute one and the same instrument.

18. **Headings**. The titles and headings of the various sections of this Agreement have been inserted for convenience of reference only and shall not be deemed to be a part of this Agreement.

19. **Further Assurances**. Each party hereto shall do and perform (or shall cause to be done and performed) all such further acts and shall execute and deliver all such other agreements, certificates, instruments and documents as either party hereto reasonably may request in order to carry out the intent and accomplish the purposes of this Agreement and the Plan and the consummation of the transactions contemplated thereunder.

20. **Severability**. The invalidity or unenforceability of any provisions of this Agreement in any jurisdiction shall not affect the validity, legality or enforceability of the remainder of this Agreement in such jurisdiction or the validity, legality or enforceability of any provision of this Agreement in any other jurisdiction, it being intended that all rights and obligations of the parties hereunder shall be enforceable to the fullest extent permitted by law.

21. **Disclosure and Use of Information**. This Section 21 shall apply if you reside outside of the United States and its territories and only to the extent required by applicable law. You hereby acknowledge that the Company holds and processes information relating to your employment, including the nature and amount of your compensation, information relating to grants made by the Company to you under this Plan or other share incentive plans, your bank

details, social security or national identity number, and other personal details ("Personal Data"). You further acknowledge that the Company is part of a group of companies operating internationally, and that, in connection with the Plan or other share incentive plans, it may be necessary for the Company to make Personal Data available to its subsidiaries and affiliates, to third-party advisors and administrators of any share incentive plans or arrangements, to service providers and other third parties in the ordinary course of business, and to regulatory authorities and tribunals (the "Third Parties"); and that these Third Parties may be located in countries other than your country of residence (the "Third Countries"), including the United States and other countries outside the European Economic Area. You acknowledge that the laws of these Third Counties may not provide for the level of data protection equivalent to that provided for in your country of residence. Any Personal Data made available by the Company as described above in relation to the Plan or any share incentive plan will be for the purpose of administration and management of the Plan or any other share incentive plan of the Company, on behalf of the Company, or as otherwise permitted or required by law. You hereby authorize the Company to hold and process the Personal Data for these purposes, and to transfer to the Third Parties and Third Countries any Personal Data to the extent necessary or appropriate to facilitate the administration of the Plan or any other share incentive plan. You authorize the Company to store and transmit Personal Data in electronic form. You confirm that, to the extent such rights exist under applicable law, the Company has notified you of your rights of entitlement to reasonable access to the Personal Data and your rights to rectify any inaccuracies in that data. Any inquiries may be directed to the Company's General Counsel and Corporate Secretary.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

TRONOX HOLDINGS PLC

By:__

Name: Jeffrey Neuman

Title: SVP, General Counsel & Secretary

PARTICIPANT

__

Name:__

Exhibit 10.5

FORM OF
RESTRICTED SHARE UNIT AGREEMENT
PURSUANT TO THE
AMENDED AND RESTATED
TRONOX HOLDINGS PLC
MANAGEMENT EQUITY INCENTIVE PLAN
PERFORMANCE-BASED RESTRICTED SHARE UNITS WITH TSR METRIC

* * * * *

Participant:

Grant Date:

Vest Date: (or if this date is not a trading day on the NYSE, the next trading day)

Number of Restricted Share Units granted:

* * * * *

THIS RESTRICTED SHARE UNIT AWARD AGREEMENT (this "Agreement"), dated as of the Grant Date specified above, is entered into by and between Tronox Holdings plc (the "Company"), and the Participant specified above, pursuant to the Amended and Restated Tronox Holdings plc Management Equity Incentive Plan (the "Plan"), which is administered by the Committee; and

WHEREAS, it has been determined by the Committee under the Plan that it would be in the best interests of the Company to grant and issue the Restricted Share Units provided herein to the Participant on and subject to the terms and conditions of the Plan and this Agreement ("TSR RSUs").

NOW, THEREFORE, in consideration of the mutual covenants and promises hereinafter set forth and for other good and valuable consideration, the parties hereto hereby mutually covenant and agree as follows:

1. **Incorporation By Reference; Plan Document Receipt Certain Defined Terms**. This Agreement is an Award Agreement for the purpose of the Plan. This Agreement is subject in all respects to the terms and provisions of the Plan (including, without limitation, any amendments thereto adopted at any time and from time to time unless such amendments are expressly intended not to apply to the Award provided hereunder), all of which terms and provisions are made a part of and incorporated in this Agreement as if they were each expressly set forth herein. Any capitalized term not defined in this Agreement shall have the same meaning as is ascribed thereto in the Plan. The Participant hereby acknowledges receipt of a true copy of the Plan and that the Participant has read the Plan carefully and fully understands its content. Unless otherwise provided herein, in the event of any conflict between the terms of this Agreement and the terms of the Plan, the terms of the Plan shall control.

2. **Grant of Restricted Share Unit Award**. The Company hereby grants to the Participant, as of the Grant Date specified above, on or as soon as practicable after the date of execution of this Agreement the number of TSR RSUs specified above. The Participant agrees and understands that except as provided by the Plan nothing contained in this Agreement provides, or is intended to provide, the Participant with any protection against potential future

dilution of the Participant's interest in the Company for any reason and no adjustments shall be made for dividends in cash or other property, distributions or other rights in respect of any such shares, except as otherwise specifically provided for in the Plan or this Agreement. The Participant also agrees and understands that the TSR RSUs are not Shares and do not confer rights on the Participant as a Shareholder.

3. **Vesting**.

(a) Total Shareholder Return Vesting. Except as otherwise provided in this Section 3, the TSR RSUs subject to this Agreement shall vest based upon the Company's Total Shareholder Return over the Measurement Period. The "Measurement Period" shall mean the period commencing on the first day of the calendar quarter immediately preceding the Grant Date and ending on the last day of the calendar quarter immediately preceding the third (3rd) anniversary of the start of the Measurement Period.

(i) Subject to the Participant's continued employment on the Vest Date, the number of TSR RSUs that shall vest pursuant to this Section 3(a) shall be equal to the aggregate number of TSR RSUs multiplied by the applicable TSR Payout Percentage. The following table shall be used to determine the "TSR Payout Percentage":

Three-Year Total Shareholder Return Percentile Ranking	TSR Payout Percentage
65th percentile or higher (Maximum)	200%
50th percentile (Target)	100%
35th percentile (Threshold)	25%
Below 35th percentile	0%

To the extent that the Company's actual Total Shareholder Return percentile ranking for the Measurement Period hereunder is between the Threshold level and the Target level or between the Target level and the Maximum level, the number of TSR RSUs to become vested hereunder shall be determined on a pro rata basis using straight-line interpolation; provided that no TSR RSUs shall become vested if the actual Total Shareholder Return percentile ranking achieved for the Measurement Period is less than the Threshold level percentile ranking set forth in the table above; and provided, further, that the maximum number of TSR RSUs that may become vested shall not exceed the number of TSR RSUs set forth in the table above corresponding to the Maximum level performance ranking. To determine the TSR Payout Percentage, performance results and TSR Payout Percentage will be rounded up/down to the nearest tenth percent (e.g. 80.57% will be rounded to 80.6%). The final number of TSR RSUs will be determined by multiplying the TSR Payout Percentage by the number of TSR RSUs at target and rounding up/down to the nearest whole unit.

(ii) The percentile ranking of the "Total Shareholder Return" (defined as Share price appreciation plus dividends reinvested) shall be the Company's Total Shareholder Return for the Measurement Period as compared to the Total Shareholder Return for the companies, without replacement, which are set forth on Exhibit A hereto.

(iii) The Company's Total Shareholder Return shall be the Company's Total Shareholder Return for the Measurement Period calculated with dividends reinvested, for the Shares as reported on the applicable national exchanges on which the Shares are listed for trading and ending on the last day of the Measurement Period (or, if the Shares are not traded on that date, on the next preceding trading date on which the Shares are traded). For purposes of calculating Total Shareholder Return:

(A) The starting price for the Shares and the stock of each company in the Capital Markets Peer Group shall be the average of the closing price for each trading day within the thirty (30) trading days ending on the day before the first day of the Measurement Period; and

(B) The ending stock price for the Shares and the stock of each company in the Capital Markets Peer Group shall be the average of the closing prices for each trading day within the thirty (30) trading days ending on the last day of the Measurement Period.

(iv) In the event of an exchange, tender offer, merger, consolidation, recapitalization, split, combination or otherwise, the Committee may make appropriate adjustments to the applicable Total Shareholder Return performance metrics. The Committee's adjustment shall be made in accordance with the provisions of the Plan and shall be effective and final, binding and conclusive for all purposes of the Plan and this Agreement.

(b) Termination in General. Except as otherwise set forth in Sections 3(c), 3(d), 3(e), 3(f), and 3(g) hereof, all unvested TSR RSUs shall immediately be canceled and forfeited upon a Termination for any reason.

(c) Termination for Death or Disability. Upon a Participant's Termination due to the Participant's death or Disability, all unvested TSR RSUs shall immediately become vested assuming a TSR Payout Percentage of 100%.

(d) Termination for Normal Retirement. Upon a Participant's Termination due to the Participant's Normal Retirement before March 5, [include year following Grant Date], all unvested TSR RSUs shall immediately be canceled and forfeited. Upon a Participant's Termination due to the Participant's Normal Retirement on or after March 5, [include year following Grant Date], a pro rata portion of the unvested TSR RSUs that would have been eligible to vest on the Vest Date shall remain outstanding and be eligible to vest based upon the Company's actual performance over the Measurement Period in accordance with Sections 3(a) as applicable, in an amount determined by multiplying the number of TSR RSUs that were eligible to become vested on the Vest Date by a fraction, the numerator of which is the number of calendar days from the Grant Date to the date of Termination and the denominator of which is the number of calendar days from the Grant Date to the Vest Date. For purposes of this Agreement, "Retirement" shall mean a Termination other than a termination for Cause at or after age 65, or such earlier date after age 50 as may be approved by the Committee with regard to such Participant, in its sole discretion, subject to Section 409A of the Code.

(e) Termination without Cause. Upon a Participant's Termination by the Company without Cause before March 5, [include year following Grant Date], all unvested TSR RSUs shall immediately be canceled and forfeited. Upon a Participant's Termination by the Company without Cause on or after March 5, [include year following Grant Date], a pro rata portion of the unvested TSR RSUs that would have been eligible to vest on the Vest Date shall remain outstanding and be eligible to vest based upon the Company's actual performance over the Measurement Period in accordance with Section 3(a) in an amount determined by multiplying the number of TSR RSUs that were eligible to become vested on the Vest Date by a fraction, the numerator of which is the number of calendar days from the Grant Date to the date of Termination and the denominator of which is the number of calendar days from the Grant Date to the Vest Date.

(f) Change in Control. Except as otherwise provided in a Participant's employment agreement, if any, Section 12.1 of the Plan shall govern the treatment of the TSR RSUs in connection with a Change in Control.

(g) Committee Discretion to Accelerate Vesting. Notwithstanding the foregoing, the Committee may, in its sole discretion (but subject to applicable law), provide for accelerated vesting of the TSR RSUs at any time and for any reason.

4. **Delivery of Unrestricted Shares**. If and when TSR RSUs awarded by this Agreement become vested, the Units shall cease to be liable to be forfeited by the Participant. By no later than ten (10) days following the date on which any TSR RSUs awarded hereunder become vested the Company, subject to satisfaction of the tax withholding requirements under Section 10 below, shall (i) deliver to the Participant a certificate or book entry transfer for a number of unrestricted Shares equal to the total number of TSR RSUs that vested on such date and (ii) make a Dividend Equivalent Payment to the Participant with respect to TSR RSUs (excluding any TSR RSUs attributable to above target performance) as provided in Section 7.5.5(b) of the Plan.

5. **Dividends and Other Distributions; Voting Rights**.

(a) Section 7.5.5(b) of the Plan shall apply with respect to the TSR RSUs.

(b) Participants have no voting rights during period of restrictions for TSR RSUs.

(c) Section 7.5.6 of the Plan shall apply with respect to the TSR RSUs (unless the Committee determines otherwise in any particular case pursuant to Section 4.3 of the Plan).

6. **No transferability**. No TSR RSU granted hereunder may be sold, transferred, pledged, assigned or otherwise alienated or hypothecated.

7. **Entire Agreement; Amendment**. This Agreement, together with the Plan, contains the entire agreement between the parties hereto with respect to the subject matter contained herein, and supersedes all prior agreements or prior understandings, whether written or oral, between the parties relating to such subject matter. The Committee shall have the right, in its sole discretion, to modify or amend this Agreement from time to time in accordance with and as provided in the Plan. This Agreement may also be modified or amended by writing signed by both the Company and the Participant. The Company shall give written notice to the Participant of any such modification or amendment of this Agreement as soon as practicable after the adoption thereof.

8. **Acknowledgment of Participant**. This award of TSR RSUs does not entitle Participant to any benefit other than that granted under this Agreement. Any benefits granted under this Agreement are not part of the Participant's ordinary salary, and shall not be considered as part of such salary in the event of severance, redundancy or resignation. Participant understands and accepts that the benefits granted under this Agreement are entirely at the discretion of the Company and that the Company retains the right to amend or terminate this Agreement and the Plan at any time, at its sole discretion and without notice.

9. **Governing Law**. This Agreement shall be governed by and construed in accordance with the laws of the State of New York, without reference to the principles of conflict of laws thereof.

10. **Withholding of Tax**. As a condition to the distribution of Shares to the Participant, the Participant shall be required to pay in cash, or to make other arrangements satisfactory to the Company (including, without limitation, authorizing withholding from payroll and any other amounts payable to the Participant), the amount that is sufficient to satisfy any federal, provincial, state, local and foreign taxes of any kind (including, but not limited to, the Participant's FICA and SDI obligations) in any and all jurisdictions which the Company, in its sole discretion, deems necessary to comply with the Code and/or any other applicable law, rule or regulation with respect to the TSR RSUs. Unless the tax withholding obligations of the Company are satisfied, the Company shall have no obligation to issue a certificate or book-entry transfer for such Shares (except as required by applicable law). The Committee, in its sole discretion and pursuant to such procedures as it may specify from time to time, may permit the Participant to satisfy his or her tax obligations, in whole or in part by one or more of the following (without limitation): (a) paying cash, (b) electing to have the Company withhold otherwise deliverable Shares having a Fair Market Value equal to the amount required to be withheld in all jurisdictions or (c) selling a sufficient number of such Shares otherwise deliverable to Participant through such means as the Company may determine in its sole discretion (whether through a broker or otherwise) equal to the amount required to be withheld.

11. **Acceptance**. The Participant shall forfeit the TSR RSUs if the Participant does not execute this Agreement within a period of sixty (60) days from the date that the Participant receives this Agreement (or such other period as the Committee shall provide). The Participant consents to receive such documents by electronic delivery through an on-line or electronic system established and maintained by the Company or another third party designated by the Company, including the acceptance of the Award and the execution of this Agreement through electronic signature, and participant agrees to be bound by such electronic acceptance and such electronic signature.

12. **Securities Representations**. The TSR RSUs are being issued to the Participant and this Agreement is being made by the Company in reliance upon the following express representations and warranties of the Participant. The Participant acknowledges, represents and warrants that:

(a) The Participant has been advised that the Participant may be an "affiliate" within the meaning of Rule 144 under the Securities Act and in this connection the Company is relying in part on the Participant's representations set forth in this Section 12.

(b) If the Participant is deemed an affiliate within the meaning of Rule 144 of the Securities Act, the TSR RSUs must be held indefinitely unless an exemption from any applicable resale restrictions is available or the Company files an additional registration statement (or a "re-offer prospectus") with regard to the TSR RSUs and the Company is under no obligation to register the TSR RSUs (or to file a "re-offer prospectus").

(c) If the Participant is deemed an affiliate within the meaning of Rule 144 of the Securities Act, the Participant understands that (i) the exemption from registration under Rule 144 will not be available unless (A) a public trading market then exists for the Shares of the Company, (B) adequate information concerning the Company is then available to the public, and (C) other terms and conditions of Rule 144 or any exemption therefrom are complied with, and (ii) any sale of the vested TSR RSUs hereunder may be made only in limited amounts in accordance with the terms and conditions of Rule 144 or any exemption therefrom.

13. **No Right to Employment**. Any questions as to whether and when there has been a termination of such employment and the cause of such termination shall be determined in the sole discretion of the Committee. Nothing in this Agreement shall interfere with or limit in any

way the right of the Company to terminate the Participant's employment or service at any time, for any reason and with or without cause.

14. **Notices**. Any notice which may be required or permitted under this Agreement shall be in writing, and shall be delivered in person or via facsimile transmission, overnight courier service or certified mail, return receipt requested, postage prepaid, properly addressed as follows:

(a) If such notice is to the Company, to the attention of the General Counsel of the Company or Secretary of the Company at such other address as the Company, by notice to the Participant, shall designate in writing from time to time.

(b) If such notice is to the Participant, at his/her address as shown on the Company's records, or at such other address as the Participant, by notice to the Company, shall designate in writing from time to time.

15. **Compliance with Laws**. The issuance of the TSR RSUs pursuant to this Agreement shall be subject to, and shall comply with, any applicable requirements of any foreign and U.S. federal and state securities laws, rules and regulations (including, without limitation, the provisions of the Securities Act, the Exchange Act, the Corporations Act, and in each case any respective rules and regulations promulgated thereunder) and any other law or regulation applicable thereto. The Company shall not be obligated to issue the TSR RSUs or any of the Shares pursuant to this Agreement if any such issuance would violate any such requirements.

16. **Binding Agreement; Assignment**. This Agreement shall inure to the benefit of, be binding upon, and be enforceable by the Company and its successors and assigns. The Participant shall not assign (except as provided by Section 6 hereof) any part of this Agreement without the prior express written consent of the Company.

17. **Counterparts**. This Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original, but all of which shall constitute one and the same instrument.

18. **Headings**. The titles and headings of the various sections of this Agreement have been inserted for convenience of reference only and shall not be deemed to be a part of this Agreement.

19. **Further Assurances**. Each party hereto shall do and perform (or shall cause to be done and performed) all such further acts and shall execute and deliver all such other agreements, certificates, instruments and documents as either party hereto reasonably may request in order to carry out the intent and accomplish the purposes of this Agreement and the Plan and the consummation of the transactions contemplated thereunder.

20. **Severability**. The invalidity or unenforceability of any provisions of this Agreement in any jurisdiction shall not affect the validity, legality or enforceability of the remainder of this Agreement in such jurisdiction or the validity, legality or enforceability of any provision of this Agreement in any other jurisdiction, it being intended that all rights and obligations of the parties hereunder shall be enforceable to the fullest extent permitted by law.

21. **Disclosure and Use of Information**. This Section 21 shall apply if you reside outside of the United States and its territories and only to the extent required by applicable law. You hereby acknowledge that the Company holds and processes information relating to your employment, including the nature and amount of your compensation, information relating to grants made by the Company to you under this Plan or other share incentive plans, your bank

details, social security or national identity number, and other personal details ("Personal Data"). You further acknowledge that the Company is part of a group of companies operating internationally, and that, in connection with the Plan or other share incentive plans, it may be necessary for the Company to make Personal Data available to its subsidiaries and affiliates, to third-party advisors and administrators of any share incentive plans or arrangements, to service providers and other third parties in the ordinary course of business, and to regulatory authorities and tribunals (the "Third Parties"); and that these Third Parties may be located in countries other than your country of residence (the "Third Countries"), including the United States and other countries outside the European Economic Area. You acknowledge that the laws of these Third Counties may not provide for the level of data protection equivalent to that provided for in your country of residence. Any Personal Data made available by the Company as described above in relation to the Plan or any share incentive plan will be for the purpose of administration and management of the Plan or any other share incentive plan of the Company, on behalf of the Company, or as otherwise permitted or required by law. You hereby authorize the Company to hold and process the Personal Data for these purposes, and to transfer to the Third Parties and Third Countries any Personal Data to the extent necessary or appropriate to facilitate the administration of the Plan or any other share incentive plan. You authorize the Company to store and transmit Personal Data in electronic form. You confirm that, to the extent such rights exist under applicable law, the Company has notified you of your rights of entitlement to reasonable access to the Personal Data and your rights to rectify any inaccuracies in that data. Any inquiries may be directed to the Company's General Counsel and Corporate Secretary.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

TRONOX HOLDINGS PLC

By:__

Name: Jeffrey Neuman

Title: SVP, General Counsel & Secretary

PARTICIPANT

__

Name:__

Exhibit 10.6

FORM OF
RESTRICTED SHARE UNIT AGREEMENT
PURSUANT TO THE
AMENDED AND RESTATED
TRONOX HOLDINGS PLC
MANAGEMENT EQUITY INCENTIVE PLAN
PERFORMANCE-BASED RESTRICTED SHARE UNITS WITH ROIC METRIC

* * * * *

Participant:

Grant Date:

Vest Date: (or if this date is not a trading day on the NYSE, the next trading day)

Number of Restricted Share Units granted:

* * * * *

THIS RESTRICTED SHARE UNIT AWARD AGREEMENT (this "Agreement"), dated as of the Grant Date specified above, is entered into by and between Tronox Holdings plc (the "Company"), and the Participant specified above, pursuant to the Amended and Restated Tronox Holdings plc Management Equity Incentive Plan (the "Plan"), which is administered by the Committee; and

WHEREAS, it has been determined by the Committee under the Plan that it would be in the best interests of the Company to grant and issue the Restricted Share Units provided herein to the Participant on and subject to the terms and conditions of the Plan and this Agreement ("ROIC RSUs").

NOW, THEREFORE, in consideration of the mutual covenants and promises hereinafter set forth and for other good and valuable consideration, the parties hereto hereby mutually covenant and agree as follows:

1. **Incorporation By Reference; Plan Document Receipt Certain Defined Terms**. This Agreement is an Award Agreement for the purpose of the Plan. This Agreement is subject in all respects to the terms and provisions of the Plan (including, without limitation, any amendments thereto adopted at any time and from time to time unless such amendments are expressly intended not to apply to the Award provided hereunder), all of which terms and provisions are made a part of and incorporated in this Agreement as if they were each expressly set forth herein. Any capitalized term not defined in this Agreement shall have the same meaning as is ascribed thereto in the Plan. The Participant hereby acknowledges receipt of a true copy of the Plan and that the Participant has read the Plan carefully and fully understands its content. Unless otherwise provided herein, in the event of any conflict between the terms of this Agreement and the terms of the Plan, the terms of the Plan shall control.

2. **Grant of Restricted Share Unit Award**. The Company hereby grants to the Participant, as of the Grant Date specified above, on or as soon as practicable after the date of execution of this Agreement the number of ROIC RSUs specified above. The Participant agrees and understands that except as provided by the Plan nothing contained in this Agreement provides, or is intended to provide, the Participant with any protection against potential future

dilution of the Participant's interest in the Company for any reason and no adjustments shall be made for dividends in cash or other property, distributions or other rights in respect of any such shares, except as otherwise specifically provided for in the Plan or this Agreement. The Participant also agrees and understands that the ROIC RSUs are not Shares and do not confer rights on the Participant as a Shareholder.

3. **Vesting**.

(a) Return on Invested Capital ("ROIC") Vesting. Except as otherwise provided in this Section 3, the ROIC RSUs subject to this Agreement shall vest based upon the Company's Three-Year Average Annual ROIC Improvement versus [Calendar Year Prior to Grant Date] ROIC during a three-year Measurement Period. The "Measurement Period" shall be [Three Consecutive Individual Years Commencing with Calendar Year of Grant].

(i) Subject to the Participant's continued employment on the Vest Date, the number of ROIC RSUs that shall vest pursuant to this Section 3(a) shall be equal to the aggregate number of ROIC RSUs multiplied by the applicable ROIC Payout Percentage. The following table shall be used to determine the "ROIC Payout Percentage":

Three-Year Average Annual ROIC Improvement versus [Calendar Year Prior to Grant Date] ROIC	ROIC Payout Percentage
	200%
	100%
	25%
	0%

To the extent that the Company's actual Three-Year Average Annual ROIC Improvement versus [Calendar Year Prior to Grant Date] ROIC hereunder is between the Threshold level and the Target level or between the Target level and the Maximum level, the number of ROIC RSUs to become vested hereunder shall be determined on a pro rata basis using straight-line interpolation; provided that no ROIC RSUs shall become vested if the actual Three-Year Average Annual ROIC Improvement versus [Calendar Year Prior to Grant Date] ROIC is less than the Threshold level set forth in the table above; and provided, further, that the maximum number of ROIC RSUs that may become vested shall not exceed the number of ROIC RSUs set forth in the table above corresponding to the Maximum level. To determine the ROIC Payout Percentage, performance results and ROIC Payout Percentage will be rounded up/down to the nearest tenth percent (e.g. 3.75% will be rounded to 3.8%). The final number of ROIC RSUs will be determined by multiplying the ROIC Payout Percentage by the number of ROIC RSUs at target and rounding up/down to the nearest whole unit.

(ii) Three-Year Average Annual ROIC Improvement versus [Calendar Year Prior to Grant Date] ROIC shall be calculated as the sum of [Calendar Year of Grant Date] ROIC less [Calendar Year Prior to Grant Date] ROIC, [Following Year of Grant Date Year] ROIC less [Calendar Year Prior to Grant Date] ROIC, and [Second Year Following Grant Year] ROIC less [Calendar Year Prior to Grant Date] ROIC, divided by three. ROIC for each calendar year shall be calculated as Income from operations for the calendar year, on a GAAP basis adjusted for any

one-time, extraordinary or non-recurring events that exceed $1 million[1], divided by the sum of Debt (Long-term debt due within one year, short-term borrowings and Long-term debt) plus Equity less Cash on a GAAP basis as adjusted[2] for that calendar year. Debt, Equity and Cash for each calendar year shall each be independently calculated based on the sum of the dollar value of each at December 31 of the year immediately preceding the calendar year plus the dollar value of each at December 31 of the calendar year, divided by two.

(iii) In the event of an exchange, tender offer, merger, consolidation, recapitalization, split, combination or otherwise, the Committee may make appropriate adjustments to the applicable ROIC performance metric, provided that in case of an acquisition, such goals may be increased and not decreased. The Committee's adjustment shall be made in accordance with the provisions of the Plan and shall be effective and final, binding and conclusive for all purposes of the Plan and this Agreement.

(b) Termination in General. Except as otherwise set forth in Sections 3(c), 3(d), 3(e), 3(f), and 3(g) hereof, all unvested ROIC RSUs shall immediately be canceled and forfeited upon a Termination for any reason.

(c) Termination for Death or Disability. Upon a Participant's Termination due to the Participant's death or Disability, all unvested ROIC RSUs shall immediately become vested assuming a ROIC Payout Percentage of 100%.

(d) Termination for Normal Retirement. Upon a Participant's Termination due to the Participant's Normal Retirement before March 5, [Year Following Grant Date], all unvested ROIC RSUs shall immediately be canceled and forfeited. Upon a Participant's Termination due to the Participant's Normal Retirement on or after March 5, [Year Following Grant Date], a pro rata portion of the unvested ROIC RSUs that would have been eligible to vest on the Vest Date shall remain outstanding and be eligible to vest based upon the Company's actual performance over the Measurement Period in accordance with Sections 3(a) as applicable, in an amount determined by multiplying the number of ROIC RSUs that were eligible to become vested on the Vest Date by a fraction, the numerator of which is the number of calendar days from the Grant Date to the date of Termination and the denominator of which is the number of calendar days from the Grant Date to the Vest Date. For purposes of this Agreement, "Retirement" shall mean a Termination other than a termination for Cause at or after age 65, or such earlier date after age 50 as may be approved by the Committee with regard to such Participant, in its sole discretion, subject to Section 409A of the Code.

(e) Termination without Cause. Upon a Participant's Termination by the Company without Cause before March 5, [Year Following Grant Date], all unvested ROIC RSUs shall immediately be canceled and forfeited. Upon a Participant's Termination by the Company without Cause on or after March 5, [Year Following Grant Date], a pro rata portion of the unvested ROIC RSUs that would have been eligible to vest on the Vest Date shall remain outstanding and be eligible to vest based upon the Company's actual performance over the Measurement Period in accordance with Section 3(a) in an amount determined by multiplying

[1] Adjustments shall include: transaction and integration costs associated with acquisitions & divestitures; restructuring charges and adjustments; non-income tax settlements causing charges or credits, except for non-income tax and social contribution recoveries in Brazil; legal settlements or judgements; reversals or charges associated with stock-based compensation expense; impairment charges; settlement and/or curtailment gains and/or losses associated with pension and/or postretirement plans; gains or losses on sale of assets, including any contract losses associated with any supply agreements in conjunction with an asset sale; adjustments to the cumulative translation adjustment account that occurs when we liquidate a subsidiary; and purchase accounting adjustments associated with the step-up/down of inventory to fair value.

[2] Adjustments shall include: the elimination of income tax payables and receivables, elimination of deferred tax assets and liabilities, related party payables and receivables related to the Jazan slagger, debt and equity issuance costs as well as the impairment of long-lived assets.

the number of ROIC RSUs that were eligible to become vested on the Vest Date by a fraction, the numerator of which is the number of calendar days from the Grant Date to the date of Termination and the denominator of which is the number of calendar days from the Grant Date to the Vest Date.

(f) Change in Control. Except as otherwise provided in a Participant's employment agreement, if any, Section 12.1 of the Plan shall govern the treatment of the ROIC RSUs in connection with a Change in Control.

(g) Committee Discretion to Accelerate Vesting. Notwithstanding the foregoing, the Committee may, in its sole discretion (but subject to applicable law), provide for accelerated vesting of the ROIC RSUs at any time and for any reason.

4. **Delivery of Unrestricted Shares**. If and when ROIC RSUs awarded by this Agreement become vested, the Units shall cease to be liable to be forfeited by the Participant. By no later than ten (10) days following the date on which any ROIC RSUs awarded hereunder become vested the Company, subject to satisfaction of the tax withholding requirements under Section 10 below, shall (i) deliver to the Participant a certificate or book entry transfer for a number of unrestricted Shares equal to the total number of ROIC RSUs that vested on such date and (ii) make a Dividend Equivalent Payment to the Participant with respect to ROIC RSUs (excluding any ROIC RSUs attributable to above target performance) as provided in Section 7.5.5(b) of the Plan.

5. **Dividends and Other Distributions; Voting Rights**.

(a) Section 7.5.5(b) of the Plan shall apply with respect to the ROIC RSUs.

(b) Participants have no voting rights during period of restrictions for ROIC RSUs.

(c) Section 7.5.6 of the Plan shall apply with respect to the ROIC RSUs (unless the Committee determines otherwise in any particular case pursuant to Section 4.3 of the Plan).

6. **No transferability**. No ROIC RSU granted hereunder may be sold, transferred, pledged, assigned or otherwise alienated or hypothecated.

7. **Entire Agreement; Amendment**. This Agreement, together with the Plan, contains the entire agreement between the parties hereto with respect to the subject matter contained herein, and supersedes all prior agreements or prior understandings, whether written or oral, between the parties relating to such subject matter. The Committee shall have the right, in its sole discretion, to modify or amend this Agreement from time to time in accordance with and as provided in the Plan. This Agreement may also be modified or amended by writing signed by both the Company and the Participant. The Company shall give written notice to the Participant of any such modification or amendment of this Agreement as soon as practicable after the adoption thereof.

8. **Acknowledgment of Participant**. This award of ROIC RSUs does not entitle Participant to any benefit other than that granted under this Agreement. Any benefits granted under this Agreement are not part of the Participant's ordinary salary, and shall not be considered as part of such salary in the event of severance, redundancy or resignation. Participant understands and accepts that the benefits granted under this Agreement are entirely at the discretion of the Company and that the Company retains the right to amend or terminate this Agreement and the Plan at any time, at its sole discretion and without notice.

9. **Governing Law**. This Agreement shall be governed by and construed in accordance with the laws of the State of New York, without reference to the principles of conflict of laws thereof.

10. **Withholding of Tax**. As a condition to the distribution of Shares to the Participant, the Participant shall be required to pay in cash, or to make other arrangements satisfactory to the Company (including, without limitation, authorizing withholding from payroll and any other amounts payable to the Participant), the amount that is sufficient to satisfy any federal, provincial, state, local and foreign taxes of any kind (including, but not limited to, the Participant's FICA and SDI obligations) in any and all jurisdictions which the Company, in its sole discretion, deems necessary to comply with the Code and/or any other applicable law, rule or regulation with respect to the ROIC RSUs. Unless the tax withholding obligations of the Company are satisfied, the Company shall have no obligation to issue a certificate or book-entry transfer for such Shares (except as required by applicable law). The Committee, in its sole discretion and pursuant to such procedures as it may specify from time to time, may permit the Participant to satisfy his or her tax obligations, in whole or in part by one or more of the following (without limitation): (a) paying cash, (b) electing to have the Company withhold otherwise deliverable Shares having a Fair Market Value equal to the amount required to be withheld in all jurisdictions or (c) selling a sufficient number of such Shares otherwise deliverable to Participant through such means as the Company may determine in its sole discretion (whether through a broker or otherwise) equal to the amount required to be withheld.

11. **Acceptance**. The Participant shall forfeit the ROIC RSUs if the Participant does not execute this Agreement within a period of sixty (60) days from the date that the Participant receives this Agreement (or such other period as the Committee shall provide). The Participant consents to receive such documents by electronic delivery through an on-line or electronic system established and maintained by the Company or another third party designated by the Company, including the acceptance of the Award and the execution of this Agreement through electronic signature, and participant agrees to be bound by such electronic acceptance and such electronic signature.

12. **Securities Representations**. The ROIC RSUs are being issued to the Participant and this Agreement is being made by the Company in reliance upon the following express representations and warranties of the Participant. The Participant acknowledges, represents and warrants that:

(a) The Participant has been advised that the Participant may be an "affiliate" within the meaning of Rule 144 under the Securities Act and in this connection the Company is relying in part on the Participant's representations set forth in this Section 12.

(b) If the Participant is deemed an affiliate within the meaning of Rule 144 of the Securities Act, the ROIC RSUs must be held indefinitely unless an exemption from any applicable resale restrictions is available or the Company files an additional registration statement (or a "re-offer prospectus") with regard to the ROIC RSUs and the Company is under no obligation to register the ROIC RSUs (or to file a "re-offer prospectus").

(c) If the Participant is deemed an affiliate within the meaning of Rule 144 of the Securities Act, the Participant understands that (i) the exemption from registration under Rule 144 will not be available unless (A) a public trading market then exists for the Shares of the Company, (B) adequate information concerning the Company is then available to the public, and (C) other terms and conditions of Rule 144 or any exemption therefrom are complied with, and (ii) any sale of the vested ROIC RSUs hereunder may be made only in limited amounts in accordance with the terms and conditions of Rule 144 or any exemption therefrom.

13. **No Right to Employment**. Any questions as to whether and when there has been a termination of such employment and the cause of such termination shall be determined in the sole discretion of the Committee. Nothing in this Agreement shall interfere with or limit in any way the right of the Company to terminate the Participant's employment or service at any time, for any reason and with or without cause.

14. **Notices**. Any notice which may be required or permitted under this Agreement shall be in writing, and shall be delivered in person or via facsimile transmission, overnight courier service or certified mail, return receipt requested, postage prepaid, properly addressed as follows:

(a) If such notice is to the Company, to the attention of the General Counsel of the Company or Secretary of the Company at such other address as the Company, by notice to the Participant, shall designate in writing from time to time.

(b) If such notice is to the Participant, at his/her address as shown on the Company's records, or at such other address as the Participant, by notice to the Company, shall designate in writing from time to time.

15. **Compliance with Laws**. The issuance of the ROIC RSUs pursuant to this Agreement shall be subject to, and shall comply with, any applicable requirements of any foreign and U.S. federal and state securities laws, rules and regulations (including, without limitation, the provisions of the Securities Act, the Exchange Act, the Corporations Act, and in each case any respective rules and regulations promulgated thereunder) and any other law or regulation applicable thereto. The Company shall not be obligated to issue the ROIC RSUs or any of the Shares pursuant to this Agreement if any such issuance would violate any such requirements.

16. **Binding Agreement; Assignment**. This Agreement shall inure to the benefit of, be binding upon, and be enforceable by the Company and its successors and assigns. The Participant shall not assign (except as provided by Section 6 hereof) any part of this Agreement without the prior express written consent of the Company.

17. **Counterparts**. This Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original, but all of which shall constitute one and the same instrument.

18. **Headings**. The titles and headings of the various sections of this Agreement have been inserted for convenience of reference only and shall not be deemed to be a part of this Agreement.

19. **Further Assurances**. Each party hereto shall do and perform (or shall cause to be done and performed) all such further acts and shall execute and deliver all such other agreements, certificates, instruments and documents as either party hereto reasonably may request in order to carry out the intent and accomplish the purposes of this Agreement and the Plan and the consummation of the transactions contemplated thereunder.

20. **Severability**. The invalidity or unenforceability of any provisions of this Agreement in any jurisdiction shall not affect the validity, legality or enforceability of the remainder of this Agreement in such jurisdiction or the validity, legality or enforceability of any provision of this Agreement in any other jurisdiction, it being intended that all rights and obligations of the parties hereunder shall be enforceable to the fullest extent permitted by law.

21. **Disclosure and Use of Information**. This Section 21 shall apply if you reside outside of the United States and its territories and only to the extent required by applicable law.

You hereby acknowledge that the Company holds and processes information relating to your employment, including the nature and amount of your compensation, information relating to grants made by the Company to you under this Plan or other share incentive plans, your bank details, social security or national identity number, and other personal details ("Personal Data"). You further acknowledge that the Company is part of a group of companies operating internationally, and that, in connection with the Plan or other share incentive plans, it may be necessary for the Company to make Personal Data available to its subsidiaries and affiliates, to third-party advisors and administrators of any share incentive plans or arrangements, to service providers and other third parties in the ordinary course of business, and to regulatory authorities and tribunals (the "Third Parties"); and that these Third Parties may be located in countries other than your country of residence (the "Third Countries"), including the United States and other countries outside the European Economic Area. You acknowledge that the laws of these Third Counties may not provide for the level of data protection equivalent to that provided for in your country of residence. Any Personal Data made available by the Company as described above in relation to the Plan or any share incentive plan will be for the purpose of administration and management of the Plan or any other share incentive plan of the Company, on behalf of the Company, or as otherwise permitted or required by law. You hereby authorize the Company to hold and process the Personal Data for these purposes, and to transfer to the Third Parties and Third Countries any Personal Data to the extent necessary or appropriate to facilitate the administration of the Plan or any other share incentive plan. You authorize the Company to store and transmit Personal Data in electronic form. You confirm that, to the extent such rights exist under applicable law, the Company has notified you of your rights of entitlement to reasonable access to the Personal Data and your rights to rectify any inaccuracies in that data. Any inquiries may be directed to the Company's General Counsel and Corporate Secretary.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

TRONOX HOLDINGS PLC

By:__

Name:

Title:

PARTICIPANT

__

Name:__

Exhibit 21.1

LIST OF TRONOX HOLDINGS PLC SUBSIDIARIES

Subsidiary	Jurisdiction of Incorporation or Organization
Cristal Metals, LLC	Delaware
Hawkins Point LLC	Delaware
Tronox Finance LLC	Delaware
Tronox Incorporated	Delaware
Tronox LLC	Delaware
Tronox US Holdings Inc.	Delaware
Non-U.S. Subsidiaries:	
CIC Switzerland	Switzerland
Hong Kong Titanium Products Company Limited	Hong Kong
Jiangxi Tikon Titanium Products Co. Ltd.	China
Millennium Inorganic Chemicals Holdings Brasil Ltda.	Brazil
Millennium Inorganic Chemicals Le Havre SAS	France
Millennium Inorganic Chemicals Overseas Holdings	United Kingdom
Millennium Inorganic Chemicals SAS	France
Millennium Inorganic Chemicals UK Holdings Limited	United Kingdom
Shanghai Millennium Chemicals Trading Ltd.	China
Tronox Australind Pty	Australia
Tronox Belgium BVBA	Belgium
Tronox Finance PLC	United Kingdom

Tronox France SaS	France
Tronox Global Holdings Pty Limited	Australia
Tronox India Private Limited	India
Tronox International BV	Netherlands
Tronox Investment Holdings Limited	United Kingdom
Tronox Investments Netherlands BV	Netherlands
Tronox Investments UK Limited	United Kingdom
Tronox KZN Sands (Pty) Ltd	South Africa
Tronox Limited	Australia
Tronox Management Pty Ltd.	Australia
Tronox Mineral Holdings Australia Pty Ltd	Australia
Tronox Mineral Sands (Pty) Ltd	South Africa
Tronox Mining Australia Limited	Australia
Tronox Pigment Bunbury Ltd	Australia
Tronox Pigment UK Limited	United Kingdom
Tronox Pigmentos do Brasil SA	Brazil
Tronox Pigments (Holland) B.V.	Netherlands
Tronox Pigments Pty Limited	Australia
Tronox Pigments (Singapore) Pte. Ltd.	Singapore
Tronox Sands Holdings Pty Limited	Australia
Tronox Saudi Industries Company	Kingdom of Saudi Arabia
Tronox UK Holdings Limited	United Kingdom

Tronox UK Merger Company Limited	United Kingdom

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (No. 333-240322) and Form S-3 (No. 333-237838) of Tronox Holdings plc of our report dated February 22, 2022 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/PricewaterhouseCoopers LLP
Stamford, Connecticut
February 22, 2022

Exhibit 24.0

POWER OF ATTORNEY

Each of the undersigned, as a director of Tronox Holdings plc (the "Company"), a public limited company registered under the laws of England and Wales, hereby appoints Timothy Carlson, Jeffrey Neuman and Steven Kaye, each with power to act without the other and with power of substitution and resubstitution, as my attorney-in-fact and agent for me and in my name, place and stead in any and all capacities,

(i) to sign the Company's Annual Report on Form 10-K under the Securities Exchange Act of 1934 for the year ended December 31, 2021,

(ii) to sign any amendment to the Annual Report referred to in (i) above, or to any previously filed Annual Report on Form 10-K for any prior fiscal year, and

(iii) to file the documents described in (i) and (ii) above and all exhibits thereto and any and all other documents in connection therewith,

granting unto each said attorney-in-fact and agent full power and authority to do and perform every act and thing requisite, necessary or desirable to be done in connection therewith, as fully to all intents and purposes as I might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any of them, or their or his or her substitutes or substitute, may lawfully do or cause to be done by virtue hereof.

This Power of Attorney may be signed in any number of counterparts, each of which shall be an original, with the same effect as if the signatures thereto and hereto were upon the same instrument.

Dated: February 22, 2022

[SIGNATURE PAGE TO FOLLOW]

Signatures	**Title**
/s/ Ilan Kaufthal Ilan Kaufthal	Chairman of the Board
/s/ Mutlaq H. Al-Morished Mutlaq H. Al-Morished	Director
/s/ Vanessa Guthrie Vanessa Guthrie	Director
/s/ Peter Johnston Peter Johnston	Director
/s/ Ginger Jones Ginger Jones	Director
/s/ Stephen Jones Stephen Jones	Director
/s/ Moazzam A. Khan Moazzam A. Khan	Director
/s/ Sipho Nkosi Sipho Nkosi	Director

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO
EXCHANGE ACT RULE 13A-14(A)/15D-14(A)
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, John Romano, certify that:

1. I have reviewed this Annual Report on Form 10-K for the year ended December 31, 2021 of Tronox Holdings plc (the "Registrant");
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the Registrant as of, and for, the periods presented in this report;
4. The Registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the Registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the Registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the Registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the Registrant's internal control over financial reporting that occurred during the Registrant's most recent fiscal quarter (the Registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the Registrant's internal control over financial reporting; and
5. The Registrant's other certifying officers and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the Registrant's auditors and the audit committee of the Registrant's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Registrant's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the Registrant's internal control over financial reporting.

Date: February 22, 2022

/s/ JOHN ROMANO

John Romano

Co-Chief Executive Officer

Exhibit 31.2

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO
EXCHANGE ACT RULE 13A-14(A)/15D-14(A)
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Jean-Francois Turgeon, certify that:

1. I have reviewed this Annual Report on Form 10-K for the year ended December 31, 2021 of Tronox Holdings plc (the "Registrant");
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the Registrant as of, and for, the periods presented in this report;
4. The Registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the Registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the Registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the Registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the Registrant's internal control over financial reporting that occurred during the Registrant's most recent fiscal quarter (the Registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the Registrant's internal control over financial reporting; and
5. The Registrant's other certifying officers and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the Registrant's auditors and the audit committee of the Registrant's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Registrant's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the Registrant's internal control over financial reporting.

Date: February 22, 2022

/s/ JEAN-FRANCOIS TURGEON

Jean-Francois Turgeon
Co-Chief Executive Officer

Exhibit 31.3

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO
EXCHANGE ACT RULE 13A-14(A)/15D-14(A)
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Timothy Carlson, certify that:

1. I have reviewed this Annual Report on Form 10-K for the year ended December 31, 2021 of Tronox Holdings plc (the "Registrant");
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the Registrant as of, and for, the periods presented in this report;
4. The Registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the Registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the Registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the Registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the Registrant's internal control over financial reporting that occurred during the Registrant's most recent fiscal quarter (the Registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the Registrant's internal control over financial reporting; and
5. The Registrant's other certifying officers and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the Registrant's auditors and the audit committee of the Registrant's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the Registrant's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the Registrant's internal control over financial reporting.

Date: February 22, 2022

/s/ TIMOTHY CARLSON

Timothy Carlson

Senior Vice President and Chief Financial Officer

Exhibit 32.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

Pursuant to 18 U.S.C § 1350, the undersigned officer of Tronox Holdings plc (the "Registrant") hereby certifies that the Registrant's Annual Report on Form 10-K for the year ended December 31, 2021 (the "Report") fully complies with the requirements of Section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934 and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Registrant.

February 22, 2022

/s/ JOHN ROMANO
John Romano
Co-Chief Executive Officer

The foregoing certification is being furnished solely pursuant to 18 U.S.C. § 1350 and is not being filed as part of the Report or as a separate disclosure document.

Exhibit 32.2

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

Pursuant to 18 U.S.C. § 1350, the undersigned officer of Tronox Holdings plc (the "Registrant") hereby certifies that the Registrant's Annual Report on Form 10-K for the year ended December 31, 2021 (the "Report") fully complies with the requirements of Section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934 and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Registrant.

February 22, 2022

/s/ JEAN-FRANCOIS TURGEON

Jean-Francois Turgeon

Co-Chief Executive Officer

The foregoing certification is being furnished solely pursuant to 18 U.S.C. § 1350 and is not being filed as part of the Report or as a separate disclosure document.

Exhibit 32.3

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

Pursuant to 18 U.S.C § 1350, the undersigned officer of Tronox Holdings plc (the "Registrant") hereby certifies that the Registrant's Annual Report on Form 10-K for the year ended December 31, 2021 (the "Report") fully complies with the requirements of Section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934 and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Registrant.

February 22, 2022

/s/ TIMOTHY CARLSON
Timothy Carlson
Senior Vice President and Chief Financial Officer

The foregoing certification is being furnished solely pursuant to 18 U.S.C. § 1350 and is not being filed as part of the Report or as a separate disclosure document.

Cooljarloo Technical Report Summary

TRONOX

1 Executive Summary

The Cooljarloo project was established in 1988. The total project involved a mine, wet concentrator and infrastructure at Cooljarloo, a mineral separation plant and synthetic rutile plant plus infrastructure at Chandala and a titanium dioxide pigment plant at Kwinana. The synthetic rutile plant is fed with ilmenite primarily from the MSP and the pigment plant then fed primarily with feedstock from the SR plant. The ore body is made up of conventional mineral sands strandlines and eminently suited to dredge mining and gravity concentration. The project currently operates within a 21 year mining lease, set from 2020, that is held 100% by Tronox Management Limited, a wholly owned subsidiary of the Company. There are an additional 2 mining leases that cover the Cooljarloo West mine life extension project and Tronox also holds a number of exploration leases nearby to the operations.

The current reserves are 361Mt tonnes at 1.8% HM grade, which gives a further 19 years of life. Current resources, additional to the reserve tonnage, are 292Mt tonnes at 1.5% HM grade.

2 Introduction

This report has been prepared by Tronox Holdings Plc in compliance with the U.S. Securities and Exchange Commission's modernization of reporting rules for geological resources and reserves for the Cooljarloo /Cooljarloo West deposits located in Western Australia.

Information used to support this technical summary of the geology includes the annual Resources and Reserves report, the original project Definitive Feasibility Study, the current Life of Mine Plan and various other relevant study documents listed in the references section of this technical report.

A Qualified Person visits the Cooljarloo mine site on at least a monthly basis. Discussions with site management on resource utilisation and optimisation opportunities are also completed regularly. Visits to the drilling areas are completed, at a minimum, on a quarterly basis.

3 Property Description

Tronox Management Pty Ltd is a subsidiary of Tronox Holdings plc and is the operator of Tronox Northern Operations which includes:

- Cooljarloo Mine, 170 kilometres north of Perth, where heavy mineral concentrates are produced from dredge mining operations
- Cooljarloo West deposits, which conjoin the Cooljarloo Mine operations
- Chandala Processing Plant, 60 kilometres north of Perth, where the heavy mineral concentrates (HMC) are separated into saleable mineral products and also where ilmenite is further upgraded to synthetic rutile.
- The laboratory and mineral testing facility is also located at the Chandala site

See Figure 1 on next page.

Mining tenements in Australia are managed at the State or Territorial level. In Western Australia, Mining Leases, Exploration Licenses and Retention Licenses are granted and administered by the Western Australian Department of Mines, Industry Regulation and Safety.

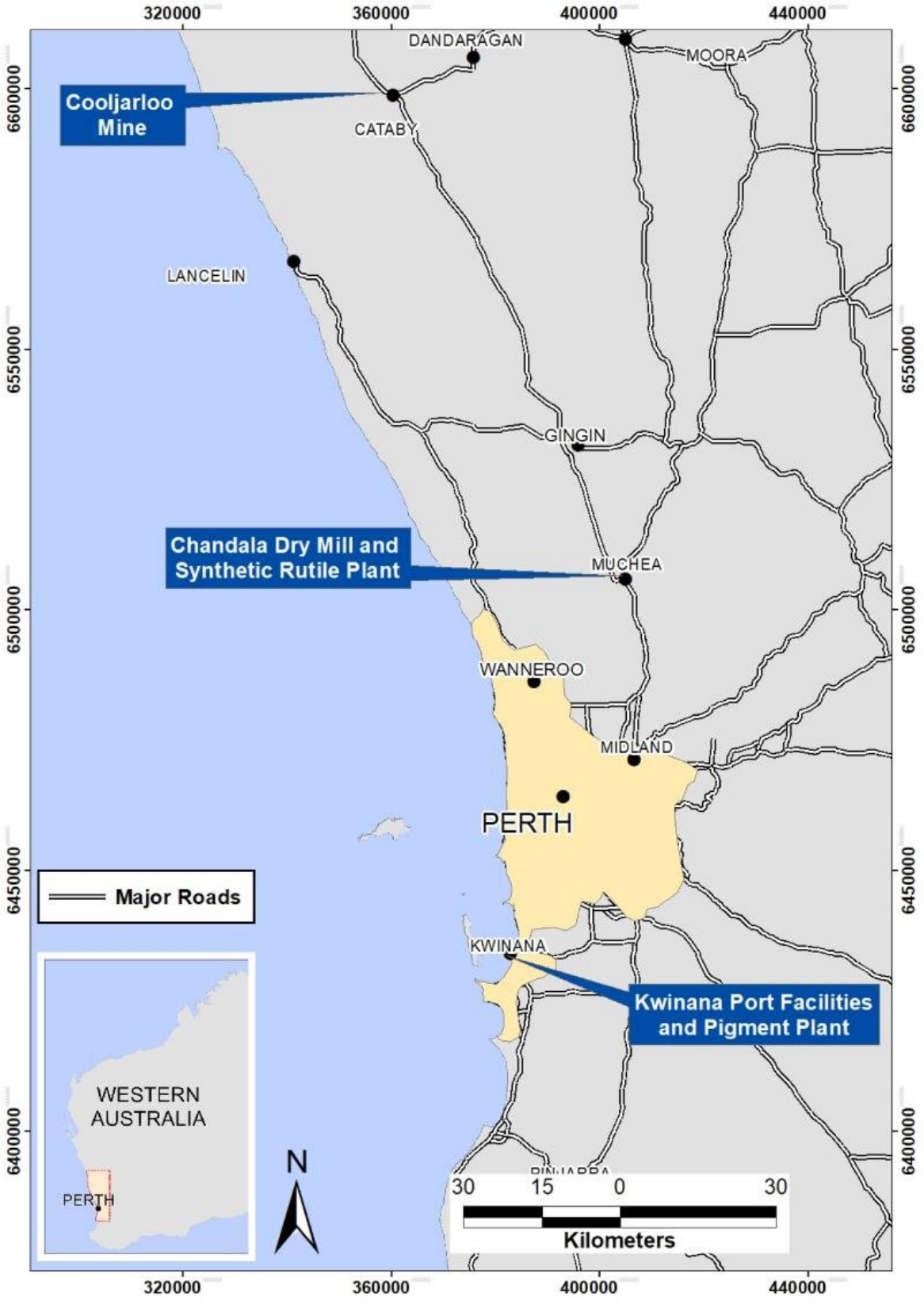
Tronox operates under three (3) mining leases which are 100% held by Tronox Management Pty Ltd., a wholly-owned subsidiary of Tronox Holdings plc, and shown in Table 1 below.

Table 1: Mining Tenement Schedule

Region	Tenement	Tenement Type	Area (Ha)	Grant Date	Expiry/ Renewal Date	Commitment US$/a	Rent U$/a	Status of Rights
Cooljarloo	M70/1398 *(Previously MSA 268)*	Mining Lease	9,744	02-Mar-2020	01-Mar-2041	701,600	138,900	Active Mining Lease
Cooljarloo (West)	M70/1314	Mining Lease	3,782	18-Mar-2015	17-Mar-2036	272,300	53,915	EPA approval pending
Cooljarloo (West)	M70/1333	Mining Lease	420	04-Apr-2016	03-Apr-2037	30,310	6,000	EPA approval pending

Tronox has one active mine site that was originally controlled by a State Agreement Act with the State of Western Australia. The mining lease (MSA 268) for this area was a State Agreement Act lease which was originally granted in 1989 for a period of 21 years and was extended for a 10 year term which expired in 2020. MSA 268 was replaced by a standard Mining Lease (M70/1398) which will expire in 2041.

Figure 1: Location of Western Australian Operations



Cooljarloo West is located within Mining Leases 70/1314, 70/1333 and 70/1398. Granting of rights to mine are pending environmental approval.

The minerals in Western Australia belong to the Crown (the State of Western Australia) and Tronox is obligated to pay a 5% revenue-based royalty on saleable mineral products. This is factored into the valuation models and optimisations conducted by Tronox.

A private royalty of 10c/t of VHM is paid for a portion of the northern section of the Cooljarloo tenement. Based on the current mine plan, mining in this royalty agreement area will cease by 2025 and the amounts paid are not material to the business.

On Mining Lease 70/1333 Tronox agrees to pay the previous holder of the exploration lease a royalty of 1% of a previously agreed price for each tonne of Valuable Heavy Mineral recovered from the Mining Lease. The cost will also be immaterial to the business.

4 Accessibility

The project area is approximately 90m above sea level and characterised by low-lying weathered sandplains dominated by Banksia, Tuart and Sheoak, while swamp environments exhibit Paperbark.

Maximum temperatures occur during the summer months ranging between 35°C and 18°C. Winter months produce the lowest average temperatures, ranging from a maximum of 18°C and a minimum of 7°C. The area experiences an average of 540 mm of rain per year, with the majority of rainfall occurring in winter. The nett annual evaporation rate is close to 2 metres per annum. Surface soils consist primarily of coarse alluvial material, and generally display very low clay (1%) and silt (1-2%) content. Soil is non-sodic and nutrient deficient with low moisture retention capability.

Both Mine and MSP sites are easily accessed.

Infrastructure availability is disclosed in Item 14.

5 History

Cooljarloo

The Cooljarloo tenements were originally pegged in 1972 by Kamilaroi Oil Company following the discovery of the Eneabba Deposits. They were subsequently obtained by Yalgoo Minerals Pty Ltd and Tific Pty Ltd in 1985 which became part of TiO2 Corporation NL (TiO2).

In 1988 prior to mining commencing, the Cooljarloo Joint Venture was formed between Kerr-McGee Chemical Corp and Minproc Ltd, subsequent reorganizations of both partners led to 100% ownership under Tronox in 2012.

No geological data generated by owners prior to the formation of the Cooljarloo Joint Venture is in use.

Cooljarloo West

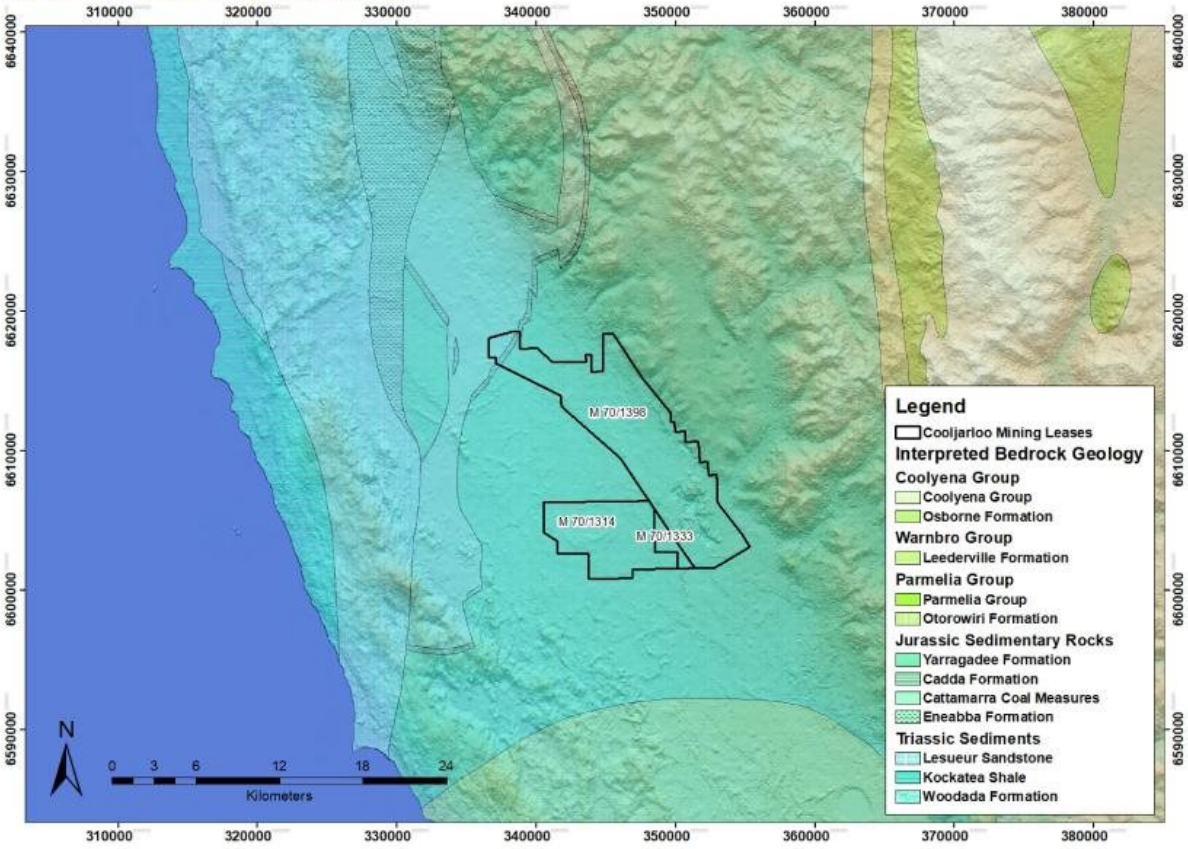
In 1990 drilling by Peko Exploration Ltd delineated a zone of deep low grade mineralisation but further drilling failed to intercept economic mineralisation. The tenements were relinquished in 1992.

Image Resources later pegged the area which were acquired by Tronox in 2005. Drilling completed by Tronox in 2007 delineated the deposits named Woolka Road, Harrier and Kestrel and Resources and Reserves are based only on data generated by Tronox.

6 Geological Setting, Mineralisation and Deposit

Tronox's deposits are situated in the North Perth Basin, which forms part of the Swan Coastal Plain and a shown in Figure 2 below.

Figure 2: Regional Geology over Elevation



The Plain sediments unconformably overlie older Mesozoic sediments deposited in continental and marine environments forming a platform on which the Cainozoic sediments accumulate. The shallow Cainozoic sedimentary sequence which hosts the commercial heavy mineral deposits are a result of a sea incursion and regression which resulted in a sequence of marginal marine and paralic sediments being deposited as far as 30km inland to the sea cut scarp.

At the Cooljarloo area this coastal plain is covered by the Bassendean Sands, the Guildford Formation and the Yoganup Formation which are predominantly all unconsolidated sediments.

Tronox's Resources are marine shoreline strands and the location and style of mineralisation is affected by the sedimentary processes which gave rise to them. The base and western (shoreward) margins tend to be discrete as these are a wave cut platform or similar coastal notch. They tend to be elongate shapes with lengths of up to 12km and lateral width of 100-300m and thicknesses of up to 10 metres (Figure 3 and Figure 4). The strands tend to be gently curved and can be interrupted by later erosion by cross-cutting surface water systems.

Figure 3: Interpreted Strandlines

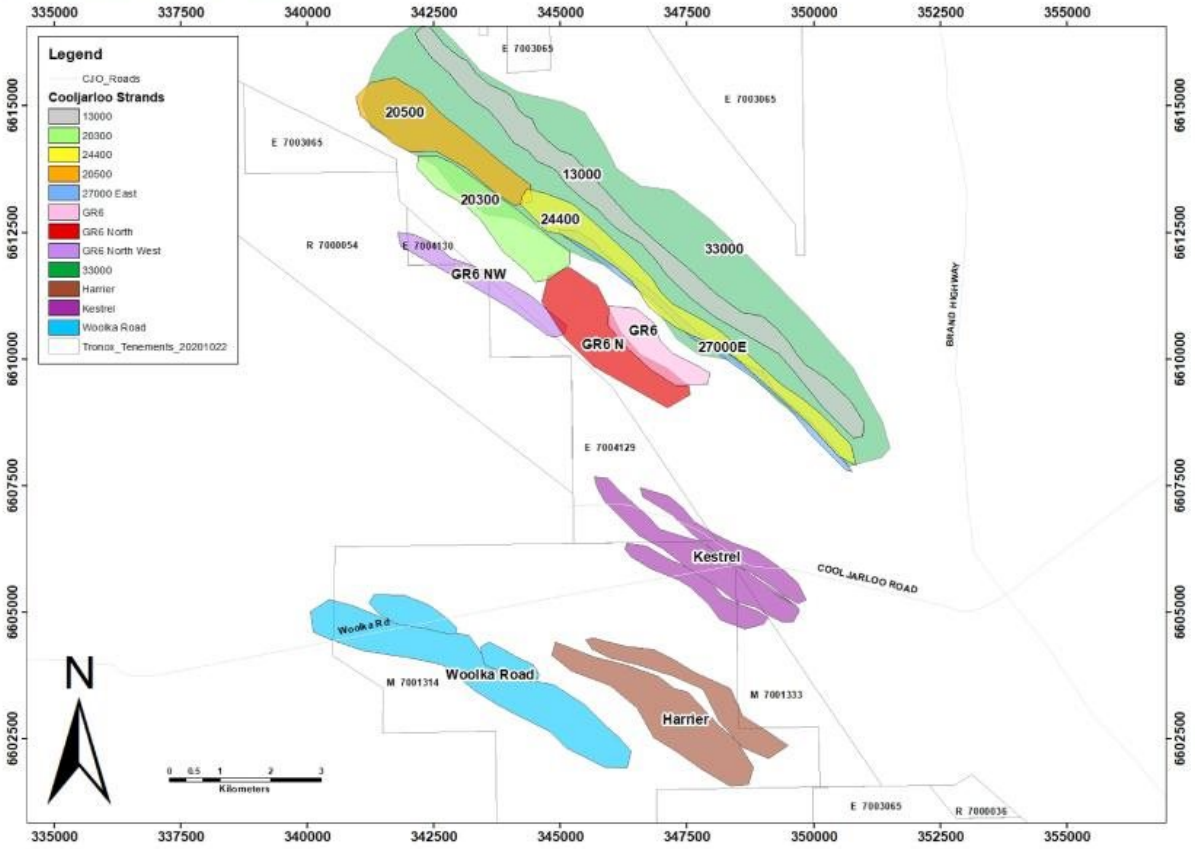
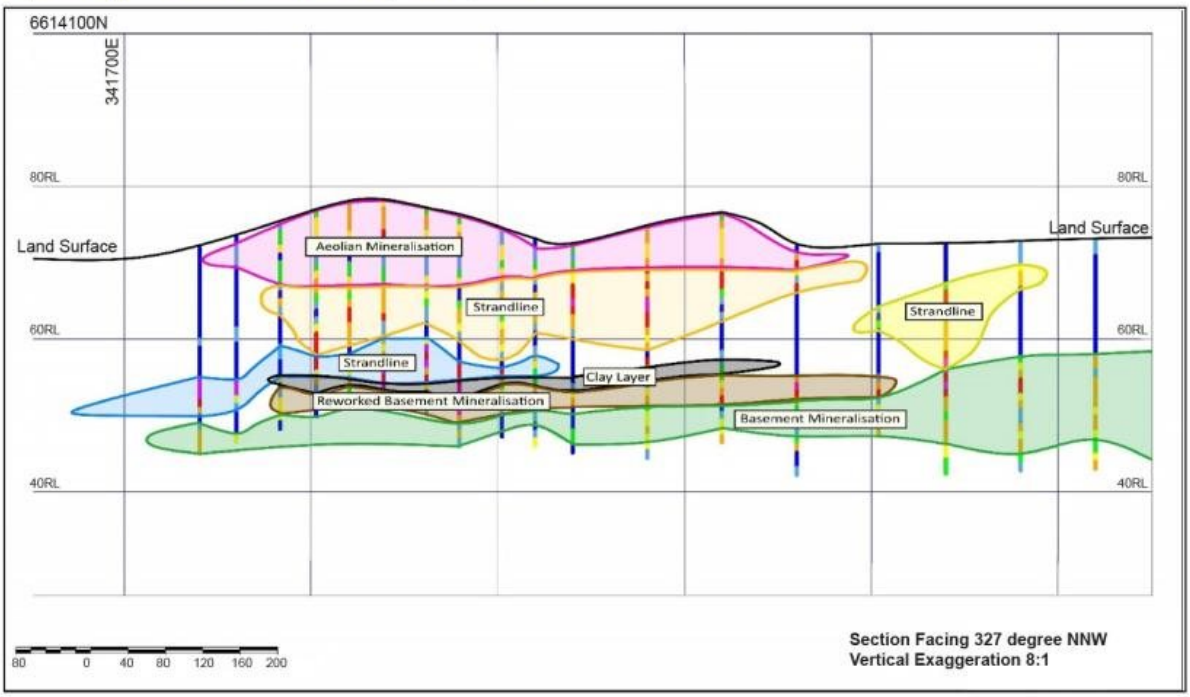


Figure 4: Typical Cross Section for Cooljarloo deposits



On a smaller scale, the mineral grades and grain-sizes are controlled by the original beach face energy, with higher zircon and rutile proportions in the HM suite with coarser grain-size as the energy increases. The deposits are all Tertiary/Quaternary and therefore have only slight post-depositional tectonism, such as regional uplift and tilting, meaning that units can be followed with some confidence.

7 Exploration

There is no relevant exploration work to disclose.

8 Sample Preparation, Analyses and Security

Drilling

Reverse circulation "aircore" drilling is completed using a small Landcruiser mounted drill. This style of drilling suits the soft sand ground conditions, and the drilling is relatively shallow (20-50m) and very rapid (30-45 minutes per hole).

Holes are drilled vertically using three metre NQ size rods, giving a nominal hole diameter at the bit of 83 mm. Drill samples are collected in one metre continuous intervals from surface. The drill sample return is captured through a cyclone to separate the air and reduce sand/slurry velocity which is then passed through a rotary splitter. All samples are sent to the Tronox's internal laboratory for heavy mineral analysis by Tetrabromoethane (TBE).

Figure 5 shows the drilling density over the interpreted strandlines that are part of the future mine plan. Previously mined areas have been excluded.

TBE Analyses

The total sample supplied from the field is dried, weighed and screened at 1mm. The remaining sample is wet attritioned and washed to remove sub 63 µm clay fines. 100g of the -1 mm +63 µm fraction is stirred into a separating flask containing Tetrabromoethane (TBE) to obtain a heavy mineral (HM) sink. The TBE density is regularly monitored to ensure minerals of less than 2.96 gcm^{-3} float. The weight of washed HM sinks are then used to calculate the heavy mineral content as a percentage of the original sample weight (HM%).

Assay data is returned from Tronox's laboratory in digital format and merged into a relational database.

Mineralogical Analyses

Tronox uses a mineralogy-based analysis technique, MA98, which was developed to provide an effective mineralogical estimation and can be completed entirely within the Chandala Assay Laboratory.

The process is completed on composited HM sinks derived from TBE Analyses. TBE sinks from similar geological domains and strands are composited together in order to achieve a minimum starting weight of approximately 100g for the mineral assemblage technique.

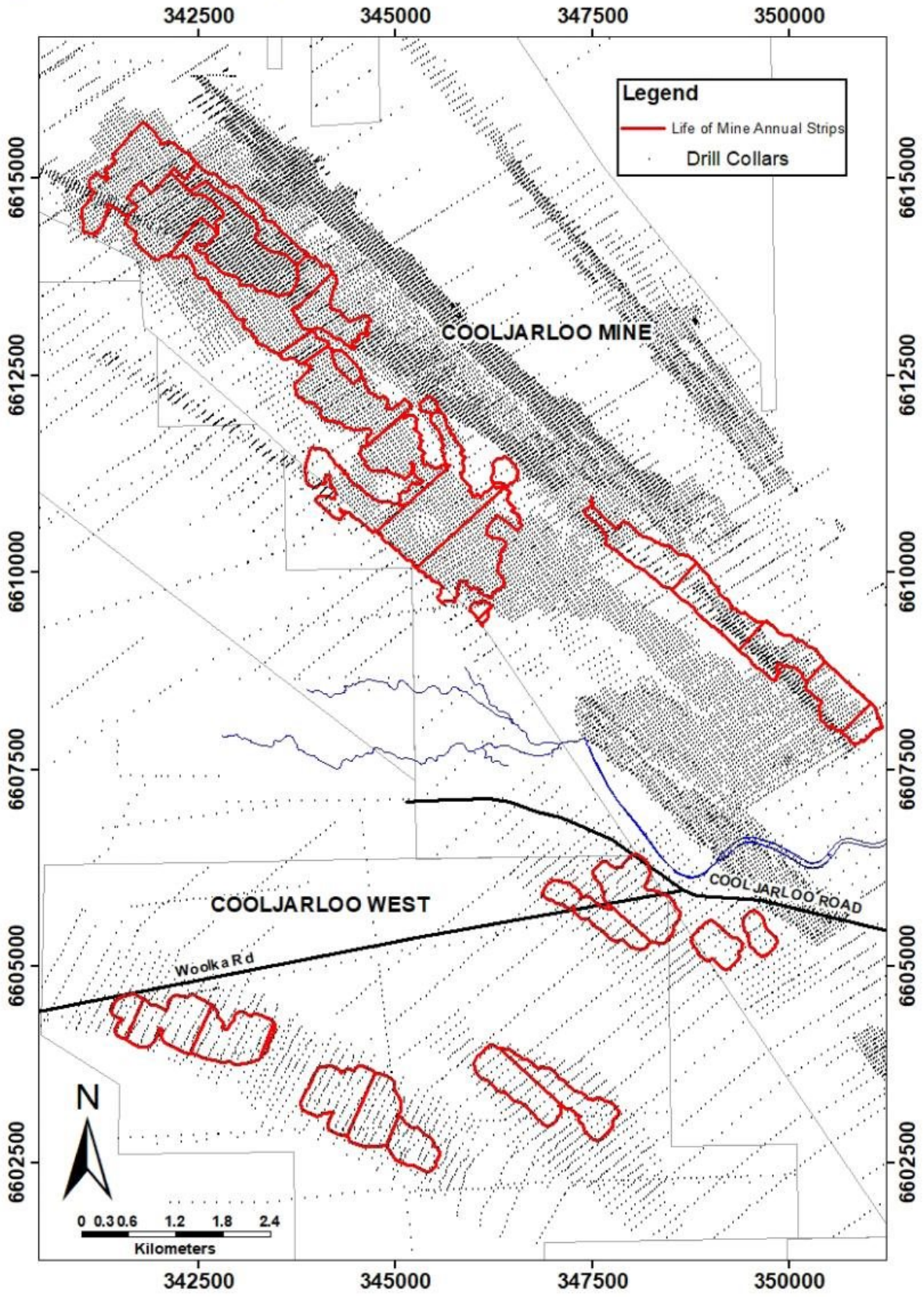
The MA98 process uses magnetic and electrostatic separation and XRF oxide determinations to reflect the mineral makeup as well as processes within the Mineral Separation Plant. The procedure uses a semi-lift induced roll magnet to separate the sample into three fractions; Mags1, Mags2 and Non-Mags. Each fraction is analysed by XRF in Tronox's certified laboratory and a Mags1 subsample is further sized and separated by Coronastat with a separate XRF analysis and wet chemistry assay for ilmenite characterisation. These various results are then integrated by a series of mathematical algorithms that estimate the mineral composition of a sample based on the sample's oxide composition. The sum of squared errors gives a good measure of confidence in the algorithm's accuracy. Currently the algorithm estimates the concentration of 18 different minerals, based on ten different oxide analyses and the three magnetic response fractions.

The MA98 algorithm provides information in addition to mineralogy, including TiO_2 and Fe_2O_3 grades of ilmenite and leucoxene, and concentrations of weakly magnetic zircon and kyanite.

Other ore assessment procedures used by Tronox provide for modelling of orebodies by mineral sizings, and FeO and U+Th in ilmenite.

The same process is used by the metallurgical teams for daily plant control and for month end plant balances, so the system is robust and calibrated against production.

Figure 5: Drill Holes over Annual Strips within the Life of Mine



9 Data Verification

Duplicates

Duplicate samples are collected from a designated depth from each hole drilled on a frequency of 1 in every 40 metres drilled. The duplicates are collected by the drilling offsider from the riffle splitter at the same time the original sample is collected.

The samples are set aside and dispatched to an independent external laboratory. The correlation between the Tronox Laboratory assay and the Western Geolabs duplicate is good. Of the 8379 samples checked with HM grades ranging from 0.01% to 42.43% the mean HM difference was 0.05%, the difference in standard deviation was 0.03% and the correlation coefficient between the two sets of data was 0.95. The small offset in mean HM grade is due to known minor differences in assay technique.

Standards

The drill loggers insert a standard sample at the end of the drill hole for processing at the Chandala Laboratory. The current standard uses Cooljarloo South mine concentrate and externally sourced clean sand with low clay fines and low oversize. The standard samples have been constructed in bulk by an external party. At two standard deviations, the results are within 4.4% relative to the expected HM value

Regular internal and external audits of reserve and resource estimation processes are done in a staged manner, where some key steps are evaluated each audit rather than the whole at once.

In 2018, an audit of drilling, sampling and assay methodologies was conducted by an independent expert. The results confirmed that practices are consistent with industry standards.

Additional verification of drill data is completed regularly based on quarterly and annual reconciliation studies using production data. Reconciled quarterly heavy mineral feed grades from 2017-2020 were 1.9% higher than the estimated in ground grades and is an accurate outcome.

Based on the data validation techniques deployed, the Qualified Person confirms that the accuracy of the mineralisation assays is in line with industry standards and is suitable to support estimates of Resources and Reserves.

10 Mineral Processing and Metallurgical Testing

Thirty + years of mining and processing mineral from the Cooljarloo field along with production forecast modelling techniques and extensive ore characterization work on domain composites provides substantial and suitable recovery information. As the project has been in the production phase for so long, the original testwork and performance estimates have been superseded by known fact. The current forecasting methods used are industry standard.

11 Mineral Resource Estimates

Resources and Reserves at Cooljarloo/Cooljarloo West are modelled using ellipsoid inverse distance cubed weighting.

The models contain estimates of all valuable minerals and the deleterious trash minerals, plus key elemental contaminants to major minerals like U+Th in ilmenite and metallurgical recovery factors such as grain sizing. These are then uploaded into the scheduling software, Xpak and finally uploaded into forecasting software, PBCS.

Mineral Reserves are subsets of Resources having used the same modelling processes but with a higher financial outcome metric applied.

The dates of the Mineral Resource and Reserve estimates for Cooljarloo and Cooljarloo West, and shown in this Technical Summary, are as of December 31, 2021.

Geological Modelling

A model of the different geological domains is generated using mine planning and modelling software, Vulcan. Geological and assay data collected during logging are displayed on graphical sections and unit boundaries/layers are digitised at 50-200m spaced intervals in a north-south sectional orientation, depending on the location and drill spacing. The digitised strings are then joined together to create wireframe surfaces which are used during the estimation process of the “Background” material, that is, the material not bound by interpreted strandlines (Figure 6).

The strand wireframe interpretations are generated in a very similar manner to the geological wireframes. A nominal cut-off grade of 0.8% HM is generally applied in order to create realistic shaped mineralised strands for estimation, which have priority over the background layers. These domains are later used to constrain variograms and block model grades.

Variography

Variography is completed for all domains to determine anisotropy and to set search ellipsoid parameters. Typical variogram ranges are greater than 80 metres across the strand and several hundred metres along strand strike.

Block Model Construction

Block models are created in Vulcan using a parent block size that is selected using Neighbourhood Analysis once variography is complete. Sub-celling is employed at domain boundaries to allow adequate representation of the domain geometry and volume. The sub-cell size is typically half the parent block size.

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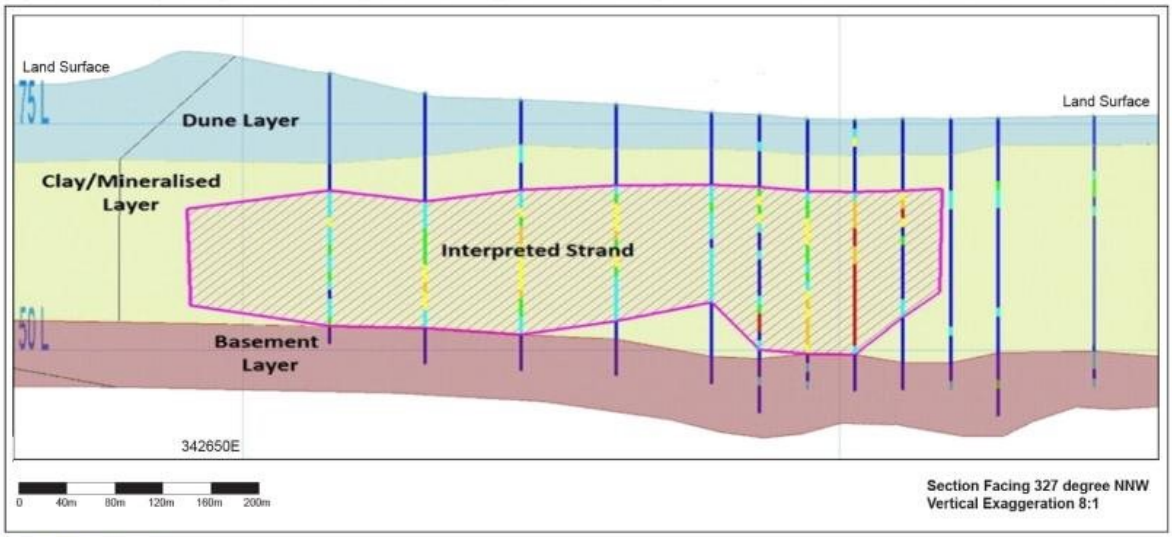
Figure 6: Geological Layers and Interpreted Orebody Section at Cooljarloo



Grade Estimation

The estimation of block grades is completed using the estimation codes and applied hard boundaries to all domains. Inverse Distance Cubed (ID3) is undertaken for heavy mineral, clay fines, oversize and mineral assemblage data. A minimum of two passes is undertaken for all domains.

Capping Values

No high-grade capping is applied to the resource estimation, however other estimation parameters control the influence of extreme high values.

Density

The bulk density for the reported resources are calculated from core samples recovered from the ore bodies. Density increases with increasing HM content and this is allowed for in a sliding formula which is applied to each ore block; Density = 1.87 + (HM*0.0092).

Density is cross-checked via monthly reconciliations against production and has not needed to be altered for many years.

Block Model Validation

Block grade estimates are validated primarily by statistical analysis and also a visual comparison to the input drill hole data.

Optimisation

The optimisation process uses mining and revenue parameters to generate a mining outline based on accumulating cash positive subset areas within the block model. A cash positive area is where revenue from dry mill products exceeds the cost of mining that area and processing the resultant concentrate.

The optimisation process is repeated using different revenue factors to create a series of nested shells.

The top of ore and bottom of ore surfaces are created for each of the revenue factors. These are then run through Vulcan again to generate tonnes and grade, whilst ensuring that mined out and sterilised areas are removed from the tonnes. Mining block sequences are created for each of the shells ore tonnes and mineral assemblage information as well as mining and processing costs.

Modifying Factors

In the resource optimisation modifying factors including recoveries, ore loss assumptions, operating costs and mineral sales pricing are used to seek the maximum value for a column of mineralization.

Cut-Off Grades

The long term mine plan and reserve estimates are derived from detailed techno-economic models created from geological, mining and analytical databases, and optimized with respect to anticipated revenues, and costs. Cost assumptions are developed from our extensive operating experience and include mining parameters, processing performance, and rehabilitation costs. Predicted mining and processing metrics are reconciled with actual production and recovery data on a monthly basis.

Models are updated as necessary and used to determine ore boundaries based on economic assumptions.

The nominal cut-off grades used to calculate resources are generally 1% HM. This is between the breakeven grade for the minerals production side of the business and the marginal cost grade where material needs to be moved and it is cheaper to dredge and process it than extract it with earth moving equipment and truck it the tailings dump. Actual cut-off grades applied in resource estimates can vary according to a number of factors, such as overburden: ore ratios and HM assemblage quality.

Classification of Resources is based on:

- Drill density
- Survey method and accuracy
- Drilling method and sampling interval
- Continuity of mineralisation and geological units
- Reliability of assay method and mineralogical information
- Frequency and results of QA/QC data
- Initial financial assessment from optimisation

Tronox relies on constraining grade variation by drilling on progressively tighter grid patterns. Initial exploration results for Inferred Resources will generally be assessed on a drill hole grid spacing of 400x80m, 400x160m or 600x160m. All holes are sampled at 1m intervals. For the style of mineralisation being investigated (strandlines) this will generally produce 3 or 4 line intercepts which confirms approximate width and strike but may be open ended.

Indicated Resources are most commonly reported based on a 100 x 80m grid or 200x80m grid, though depending on the width of strand this may be varied to a 200x20m or 200x40m grid. This will generally constrain the strands limits, confirm strike across several line intercepts and provide good confidence of grade variability.

Measured Resources use a 50x40m grid with closer infill near boundaries. Thinner, high grade strands may require closer spaced 50mx20m grid before being considered Measured. This will constrain volumes over many drill sections intercepts, provide confident grade variation control over multiple internal populations and provide adequate lithological information for mining criteria.

The mineral assemblage assays are applied on both downhole composites and along section composites within geological domains. Typical variogram ranges are greater than 80m across the strand and several hundred metres along strand strike.

The initial financial assessment from optimisation, as well as grade tonnage curves, also aid in the classification of Resources and Reserves. Figure 7 below outlines the physical location of the resources in relation to the reserves. There is little physical reason why some or all of those resources might not be mineable with the existing dredges and concentrator. Additional resource definition is needed.

The categorisation of resources is made based on the judgements of the Qualified Person, in consultation with the mining development engineer and resource geologist.

Tronox uses breakeven contribution as a guide to cut-off determination rather than just grade. This allows for the polymetallic nature of the resource and the broad mineralization of surrounding areas. As costs change over time and long-term revenue values change, new reviews are conducted which may lead to a different shell becoming optimal.

A summary of Mineral Resources as of December 31, 2021 are included in Table 2.

Table 2: Summary Mineral Resources at December 31, 2021

	Measured mineral resources					**Indicated mineral resources**					**Measured + Indicated mineral resources**					**Inferred mineral resources**	
	Material (Kt)	HM%	Mineral Assemblage			Material (Kt)	HM%	Mineral Assemblage (% of HM)			Material (Kt)	HM%	Mineral Assemblage (% of HM)			Material (Kt)	HM%
Heavy Mineral Sands			Ilmenite	Rutile and Leucoxene	Zircon			Ilmenite	Rutile and Leucoxene	Zircon			Ilmenite	Rutile and Leucoxene	Zircon		
Cooljarloo	10,254	1.5	58.7	7.7	9.7	201,517	1.6	61.6	6.2	10.1	211,770	1.6	61.4	6.2	10.1	-	-
Cooljarloo West						80,293	1.3	60.7	8.5	11.6	80,293	1.3	60.7	8.5	11.6	-	-
Total	10,254	1.5	58.7	7.7	9.7	281,810	1.5	61.4	6.7	10.5	292,063	1.5	61.3	6.8	10.4	-	-

**N.B. Resources are Exclusive of Mineral Reserves*

The Qualified Person considers the data validation and geological modelling processes in addition to monthly and annual reconciliations between forecast grades and actual mined grades confirms that the mineralisation estimates are in line with industry standards and is entirely suitable to support estimates of Resources.

12 Mineral Reserve Estimates

Mineral reserves are essentially subsets of resources having used the same modelling processes but with tighter scrutiny and application of the various modifying factors as well as a higher financial outcome metric being applied. The nominal cut-off grades used to calculate ore reserves are generally 1.3% HM which is close to breakeven. Actual cut-off grades applied in reserve estimates can vary according to a number of factors such as overburden: ore ratios and HM assemblage quality.

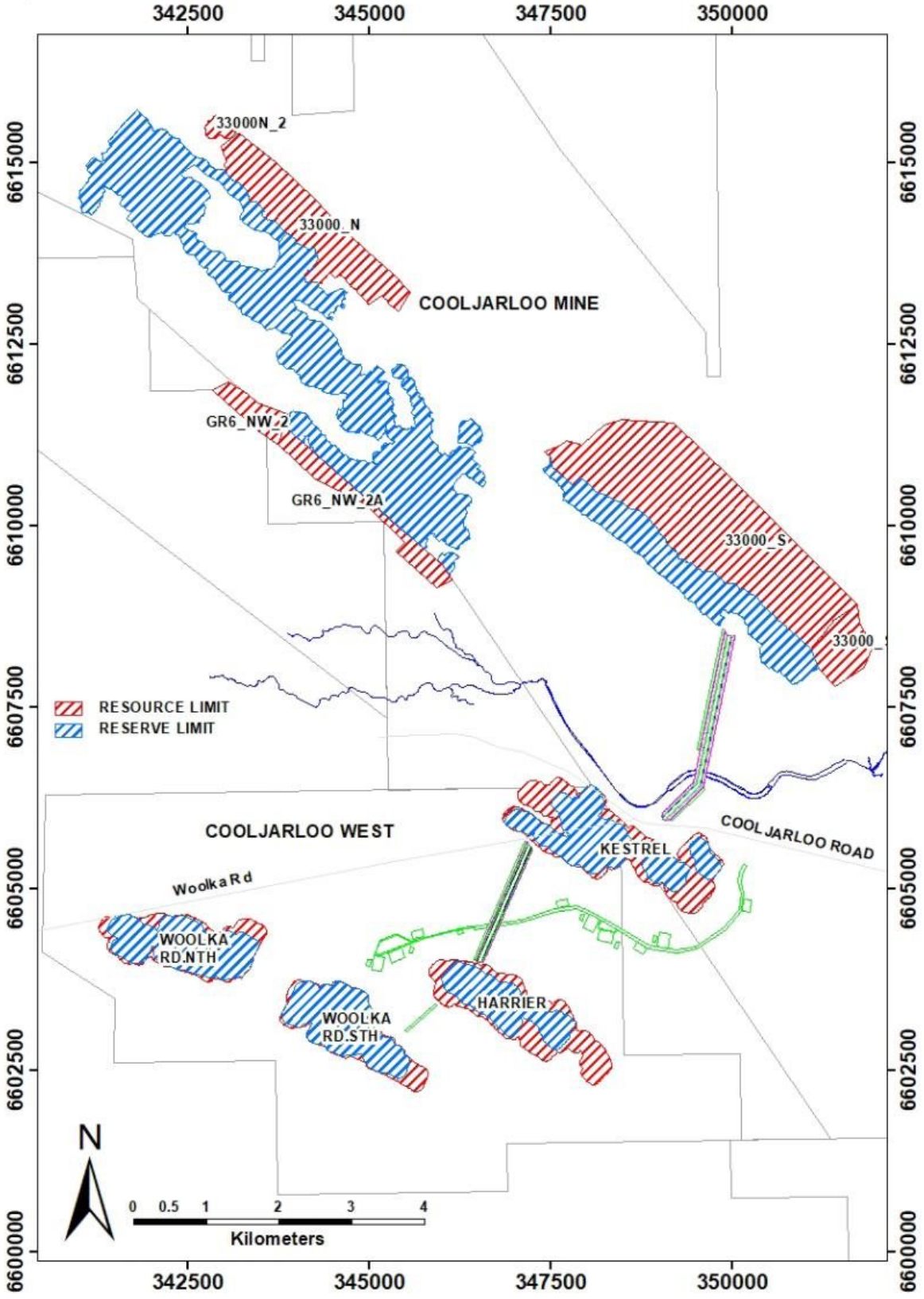
The reserves as of December 31, 2021 are shown in Table 3 below.

Table 3: Summary Mineral Reserves as of December 31, 2021

	Proven mineral reserves					**Probable mineral reserves**					**Total mineral reserves**				
	Material (Kt)	HM%	Mineral Assemblage			Material (Kt)	HM%	Mineral Assemblage			Material (Kt)	HM%	Mineral Assemblage		
Heavy Mineral Sands			Ilmenite	Rutile and Leucoxene	Zircon			Ilmenite	Rutile and Leucoxene	Zircon			Ilmenite	Rutile and Leucoxene	Zircon
Cooljarloo	230,730	1.7	61.1	7.7	10.5	-	2.0	-	-	-	230,730	1.7	61.1	7.7	10.5
Cooljarloo West						130,492	2.0	60.5	8.3	12.3	130,500	2.0	60.5	8.3	12.3
Total	230,730	1.7	61.2	7.7	10.5	130,492	2.0	60.5	8.3	12.3	361,230	1.8	60.9	7.9	11.2

1) Mineral prices used in Reserve estimation are substantially in line with the prices for each of our products published quarterly by independent consulting companies
2) Conversion of in ground grade to saleable product yield, taking into account all of the losses in mining and processing, is for ilmenite typically 83%, for rutile 94%, for Leucoxene 66% and for zircon 80%

Figure 7: Resource in relation to the Reserve outline



13 Mining Methods

Cooljarloo mine commenced operation in 1989 and has operated with 2 dredges in the one pond since 1999 and currently uses (Table 4)

- The original Ellicott Cooljarloo1 dredge and,
- The smaller capacity Neumann built Pelican which was brought into service in 2012.

Table 4: Dredge Parameters

Dredge Parameters	Cooljarloo I	Pelican
Length	65 m	50 m
Width	15 m	12 m
Max Effective Mining Depth	25 m	15 m
Total Dredge Power	3Mwh	1.6Mwh
Dredge Pump Size	28/24	16/14
Max Mining capacity	3000tph	1000tph

The bucket wheel dredges operate in a purpose-built pond which sits within the ore mining limit. They are connected to a floating concentrator via floating pipelines and high voltage (HV) cables for power. The dredge pond typically sits at or slightly below the natural ground water table level so there is a high degree of ground water inflow to maintain the pond. Losses of pond water are associated with clay fines management, concentrate stockpiling and natural evaporation. An extensive network of shallow bores around the site are used to make up for the losses.

The pond has an area typically 30Ha. The dredges swing side to side in an arc pivoting around a spud driven into the pond bottom and wire winch rope side anchors buried in the pond walls. After the initial mining of the full face and advance distance, Cooljarloo 1 will retreat back and do a clean-up sweep of the floor where it pumps all the loose ore that was not initially picked up when mining at the face.

Typical relationships between the two dredges and the floating concentrator are shown in Figure 9.

The Concentrator is connected to land through a pump pontoon via floating pipelines and HV cable. After both dredges and the Wet Concentrator have reached the full extent of their float line length, a ramp move is done. Depending on the width and depth of the dredge pond this relocation is done approximately every eight to twelve weeks as the full dredge face advance is approximately 110 metres per month. The total forward advance distance of the dredge pond since start-up is 40km.

Ore mined is pumped as a slurry to a rotating trommel where a small amount of oversize rocks and debris are rejected back into the dredge pond. The sand drains into a surge bin where it is diluted with water and pumped to the wet gravity concentrator circuit. Both dredges pump their feed simultaneously to the wet concentrator. However, depending on the surge bin level the dredges adjust their feed accordingly to keep the bin level stable.

Figure 8: Pelican (foreground), Cooljarloo 1 (mid ground) and Concentrator (background)

To establish where in relation to the mine plan the dredges are mining, there are GPS receivers on both dredges and Wet Concentrator that records location, dredging depths and swing distances. Information such as run time throughput, pumping density along with other production data are also recorded on each dredge and the wet concentrator.

Mining plans are established using a grid method known as centrelines, which are loaded into the dredges GPS systems. The plan is visible to the operators as to which centreline they will be mining on each shift. The dr3dx GPS software helps the operator track location and dredging depth in relation to the plan and other performance data.

In the planning phase a range of resource shells are generated based on business requirements. These shells are generated using a Tronox in-house Visual C++ optimization script and variations of the revenue factor. The output for each run is a set of point data for the optimised top, bottom and extremities of ore. For the chosen shell, these points are uploaded into the site mine planning design software Vulcan where they are smoothed out for mining practicality as well as adding crest and toe strings to form the pit walls at an angle based on the general ore characteristics.

Overburden removal is by truck and shovel and is carried out by contractor. Over the life of mine, overburden quantity averages 5Mbcm/annum. Any high overburden faces are extracted in 4 metre benches. Pit wall slopes are typically 30 degrees but can be up to 45 degrees in areas of higher clay content.

Overburden is generally removed 3 months ahead, exposing enough ore to keep apart the dredges and mining face so as not to compromise safety and production risks. Overburden is usually dumped directly onto the sand tailings beach at the back of the pond, or onto dried out clay-fines cells, to create final landform. Truck types commonly used are Caterpillar 785B and 777's as well as articulated D400E. Capacity varies from 40t to 150t each. Excavator used is typically a Komatsu PC2000.

Most deposits mined at Cooljarloo have little issue with digging conditions and therefore geotechnical work is only performed occasionally. Ground water and surface water flow models are maintained but even in the driest conditions water availability has never been a significant issue. The digging method is such that as the face is disturbed at the toe, using the dredge bucket wheel, the whole face tends to collapse. This material is relatively fluid and easy to pump away.

The total tonnage of dilution over the past decade has averaged 4%. However, dilution material typically has a grade in the range of 0.8% HM to 1.2% HM and significantly mitigates the impact.

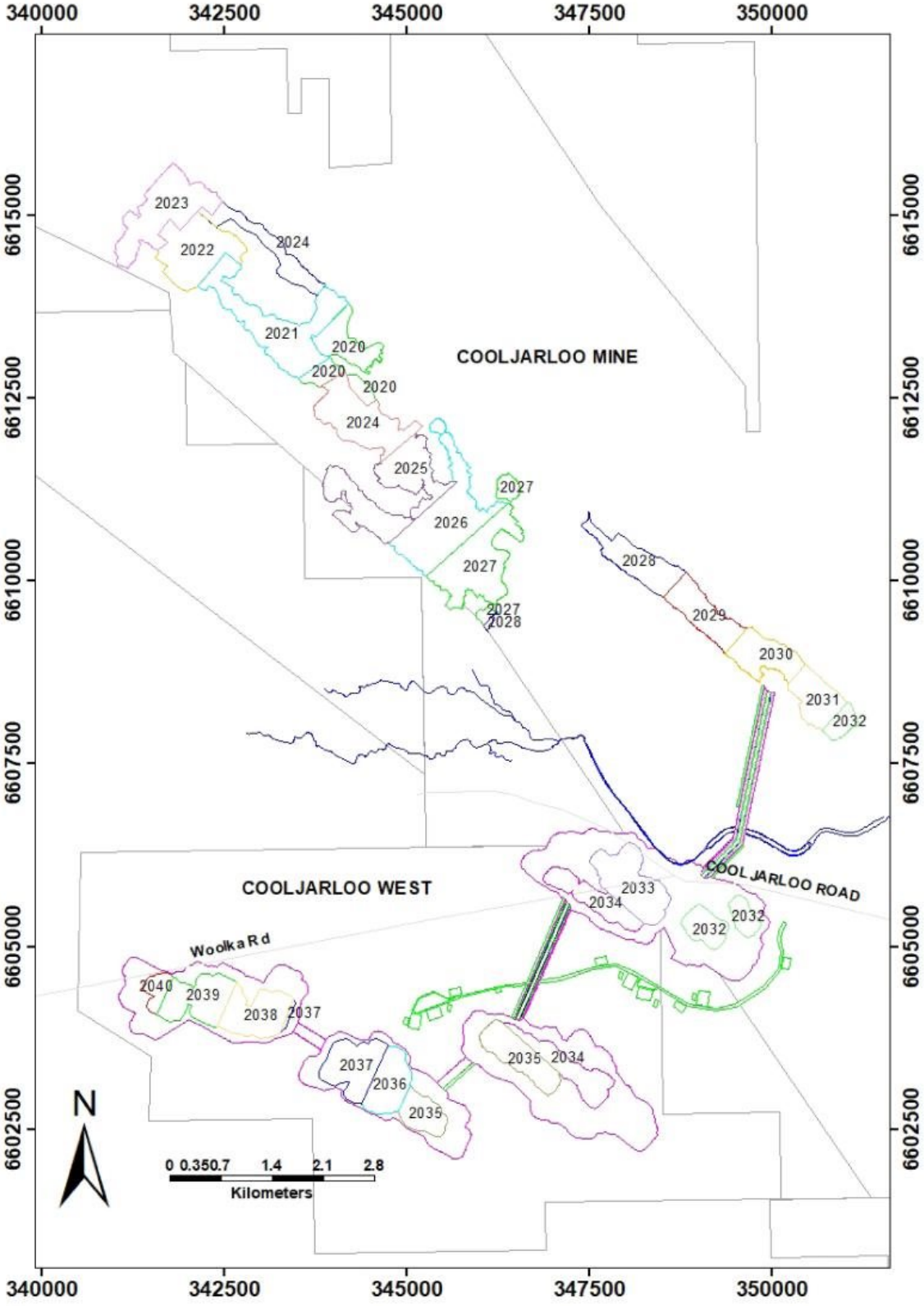
The dredging operation uses approximately 1.5Gl of water per month of which 0.5Gl comes from a shallow bore field network across the site. The rest comes from natural ground water inflow to the dredge pond and returns from off path clay fines thickening cells.

In slurrying the ore for primary concentration the clay and silt component become liberated. Once suspended, the clay fines tailings are allowed to settle and pumped to clay consolidating ponds where they dry by evaporation.

The current LOM plan annual ore blocks and sequence of annual mining is shown in Figure 10.

The cross-country distance travelled by the dredges and trailing concentrator is significant, which requires good planning and execution of site infrastructure relocation.

Figure 9: Annual Ore Blocks for the Life of Mine Plan



14 Processing and Recovery Methods

Spiral wet gravity concentrators are used for the recovery of VHM at Cooljarloo. The spiral circuit consists of five stages: roughers, middlings, cleaners, recleaners and classifiers. Clay fines are managed by entrapment in sand tailings and natural thickening and removal in the pond. No flocculants are required in the process. The plant spiral circuit layout is set up as two parallel streams as this facilitates steady operation should one dredge be shut down and also facilitates access for unscheduled maintenance events.

The dredges and the concentrator are electrically powered, predominantly consumed by the various pumping duties between process stages. The total power consumption is approximately 9Mwhr with the major power consumers being Cooljarloo 1 dredge at 3Mwh, Pelican dredge at 1.6Mwh and the wet concentrator at 4Mwh.

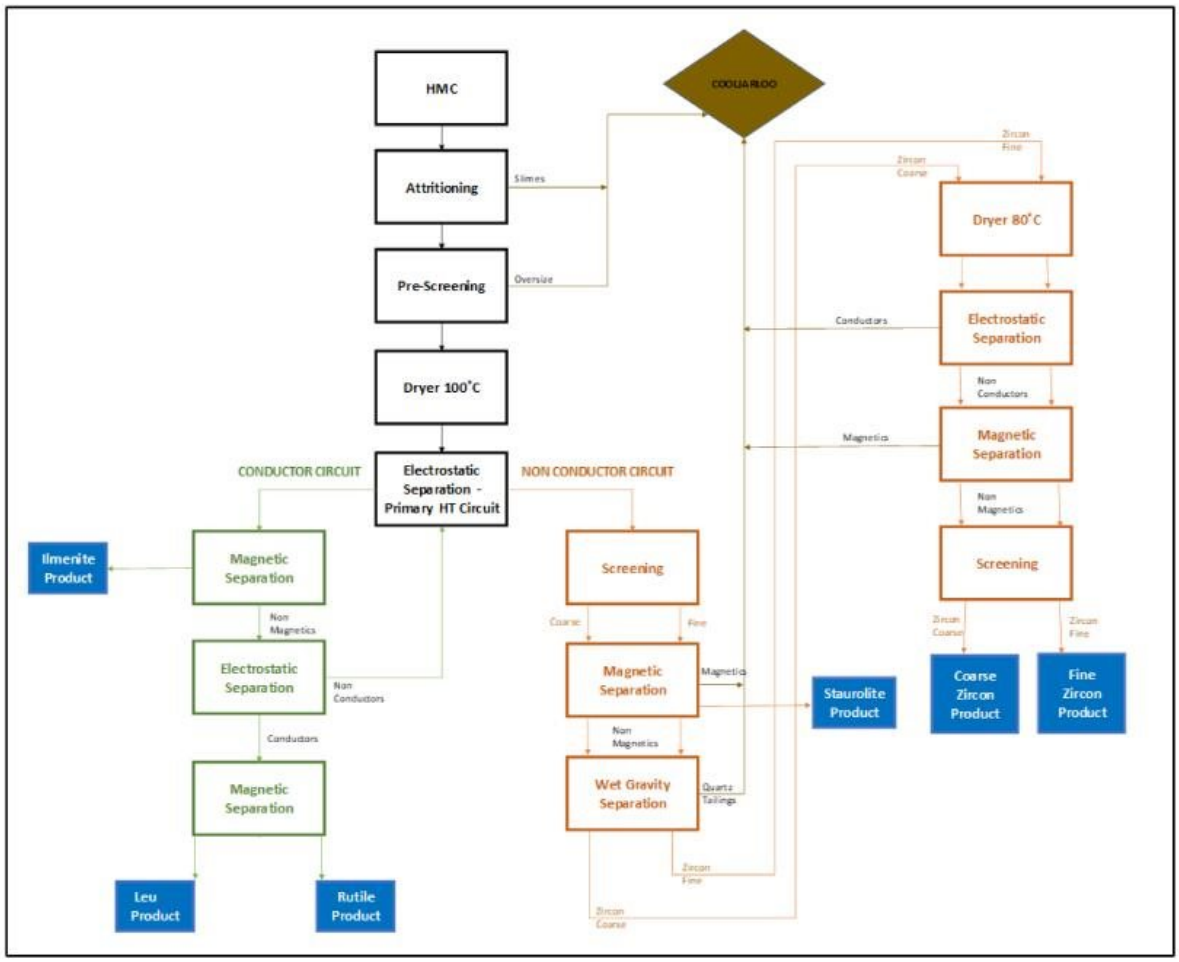
The operation runs 24 hours per day, 365 days per year and has shift operators, a day crew, maintainers, and sundry support personnel directly employed. Overburden removal and postmining land forming is done by contractors.

Drained HMC at Cooljarloo is loaded by front end loader into 93 tonne triple road trains for haulage to the Chandala Mineral Separation Plant. Haulage of HMC to, and mineral product from, the MSP are managed by a logistics contractor. Both the mine and MSP are based on physical separation processes. There is no need for chemical or physical alteration in order to achieve good product recovery and quality. Attritioning is a critical process step to ensure clean mineral surfaces that are responsive to the electrostatic HT separators. The attritioned HMC is presented by filter belt to a natural gas fired drier that not only removes the moisture but heats the mineral so that it is most responsive to the primary stage electrostatic separation circuit.

The unit operations at the MSP are many and varied but the significant ones are as follows: (1) vibrating and reciprocating woven wire screening, (2) mechanical slurry attritioning, (3) gas fired fluid bed drying, reheating and cooling, (4) HT Roll, Coronastat and Plate electrostatic separators, (5) Rare Earth Drum, Rare Earth Roll, Induced Roll and Semi-Lift magnetic separators, (6) Hydrosizing and (7) spiral gravity and centrifugal jig concentrators

A simplified schematic flowsheet for the Chandala MSP is shown below in Figure 10.

Figure 10: Schematic MSP Flowsheet (Flowsheet needs updating to reflect the one Leu product)



Typical saleable mineral product qualities are shown in Table 5 below.

Table 5: Mineral Product Qualities

	Ilmenite	Rutile	Zircon
TiO2 %	60.5-63.0	93.0–95.0	0.08-0.15
Fe2O3 %	32-34	0.7-0.9	0.03-0.06
ZrO2 (inc HfO2) %	0.2	0.5-0.8	66.0-67.0
MnO2 %	1.1-1.4	-	-
SiO2 %	0.6-0.8	0.6-0.85	32.1 – 32.8
Al2O3 %	0.7-1.0	0.25-0.4	0.4-0.6
V2O5 %	0.20-0.25	0.4-0.5	-

The MSP processes all the HMC produced at the mine in that year. Power consumption is 1.9Mwh. The plant has shift operators, a day crew, maintainers, and sundry support personnel directly employed.

15 Infrastructure

The Brand Highway is a major bitumen road running from Muchea, just North of Perth up to Geraldton, a provincial city 450km north of Perth. The road runs just past the Western boundary of the Chandala site and just past the Eastern boundary of the Cooljarloo mine site. It is suitable for all weather and wide loads.

There is a 132kV power line that also runs from Perth to Geraldton and passing near the Chandala site and through the mine site. Tronox has a substation on its property in order to draw and reticulate 22kV power from the sub-station connected to the main high voltage distribution line. At the various locations power is ultimately transformed down to 415V. The same situation exists for Chandala and it gets power from the same main line.

Two gas pipelines run just a kilometre to the West of the Chandala site. They are referred to as the Dampier to Bunbury Natural Gas pipeline (DBNG) and also the Parmelia line which originates just south of Geraldton. The Chandala Mineral Separation Plant currently gets supply for driers and re-heaters from the Parmelia line.

The countryside surrounding both Chandala and Cooljarloo is relatively flat. This made the construction of buildings and fixed plant straightforward. Storage ponds for solid waste from the MSP were able to be made quite shallow only being a few metres above natural ground level.

There is a large freshwater aquifer (Yarragadee) immediately to the west of the Brand highway adjacent to the Chandala site. Tronox has a borefield there to supply the licensed 1megalitre/annum of water that the site requires. Even in times of severe drought, supply from this aquifer has never been at risk. Cooljarloo draws from an extensive field of relatively shallow bores and also an extension of the Yarragadee aquifer. To limit pumping distances, it has been preferable to have multiple smaller bores around the site since the dredging operation has travelled more than 40km within the mining lease area since 1989. Tailings disposal at Cooljarloo is all placed behind the dredging operations and incorporated into rehabilitation. There is a registered waste disposal pit where wastes from the MSP, the Synthetic Rutile plant and from the Kwinana pigment plant are licensed to be stored. That pits are constructed above the water table and are clay lined and when full, capped to minimize the ingress and egress of water.

The Chandala operation utilizes two port facilities. The Port of Fremantle is used for export of bagged and containerized mineral products and the Port of Bunbury is used for bulk shipments. Tronox rents storage and warehousing facilities at or nearby to those sites.

For Cooljarloo there is a new permanent single person's quarters (SPQ), capable of accommodating the majority of the work force. At Chandala, employees and contractors are primarily sourced from the Perth metropolitan area.

16 Market Studies

The principal commodities titanium and zircon are freely traded, at prices and terms that are widely known, so that prospects for sale of any mineral production are virtually assured.

Tronox is among the world's leading producers of TiO2 based pigments and has the specific strategy of being predominantly vertically integrated. This means that its own mining production will provide the bulk of the titanium feedstock to its 9 pigment plants, located around the globe. Tronox Management Pty Ltd now markets all mineral products sold emanating from the Cooljarloo mine. However with the integrated pigment strategy, this predominantly relates to the range of zircon products and a relatively immaterial amount of sandblasting staurolite product. The Cooljarloo zircon products are highly sought for use in tile ceramics and refractories.

Tronox routinely uses the services of various industry trade consultants to closely monitor and report on global production of titanium minerals and zircon as well as reporting on the current global supply and demand status, plus projections of new projects to come on stream, both timing and capacity. Export and import data by country is monitored. As noted earlier, zircon, TiO2 feedstock and TiO2 product pricing are internationally traded, specialized commodities. Generally speaking, the prices of our products are substantially in line with the prices for each of these products published quarterly by TZ Minerals International Pty Ltd (TZMI) and other independent consulting companies who track the mineral sands, titanium dioxide and coatings industries.

The ilmenite product is of chloride grade and has a micro-porosity/reactivity that makes it ideally suited to the Becher Synthetic Rutile process or direct chlorination. Natural Rutile has been marketed in the past with a TiO2 content of 95+% but is currently blended with leucoxenes and consumed internally by Tronox.

The bulk of Cooljarloo zircon is classified as Premium Grade. A couple of slightly higher contaminant grade products called HTZ and ZCM are also produced and generally sell for a price in proportion to the zircon content. Over the past decade Tronox zircon has consistently sold in line with market pricing.

17 Environmental studies, permitting and plans, negotiations, or agreements with local individuals or groups

The aim in rehabilitation is to replicate the nature of the original soil profiles within mined out areas. Cooljarloo sand tailings material comprises benign quartz sands with minor clays and heavy minerals and settle to a final dry bulk density of 1.5 t/m^3. Tailings and clays are, in the main, handled and stored separately. Clays are commonly pumped at a solids content of 25%, drying to approximately 95% solids (dry bulk density = 1.5 t/m^3). Water used in the processing of the mineralized sands is basically fresh with very low salinity levels.

Clays liberated from the ore are managed, in the majority, by solar drying. This approach requires dedicated clay drying cells which are usually constructed within previous mine voids or atop backfilled voids. Solar drying cells are constructed using embankments not exceeding a height of 5 metres. Following final drying and consolidation, additional sands and/or overburden are placed to bring the area to the final designed contour and ensure the appropriate subsoil materials are in place for rehabilitation pursuant to the mine closure plan.

Environmental approvals are in place subject to implementing rehabilitation and monitoring programmes based on pre-mining research, establishing long term monitoring studies, prevention of dieback, monitoring of ground and surface water conditions and dust control measures at the MSP, annual reporting and that any proposal to extend mining would require the approval of the Environmental Protection Authority

Surface water drains in a westward fashion from the scarp, flowing via a number of creek lines. All watercourses in the area are seasonal, and usually terminate in swamps, or dissipate within the local alluvial soil profile.

All current and future above ground Cooljarloo Tailings Storage Facilities (TSF) are rated as Low Hazard, Category 3 in accordance with the DMIRS Guidelines on the Safe Design and Operating Standards for Tailings Storages.

Prior to accessing overburden or ore, 100 mm of material is collected in a 'first cut' which is broadly considered to be topsoil and is stockpiled accordingly. The 'second cut' is 200 mm onwards to the overburden, this represents the subsoil which, when appropriate is collected and stockpiled separately to the first cut topsoil for later use in rehabilitation.

Cooljarloo is also an approved mineral residue facility (MRF) and receives waste products generated at the Chandala MSP and synthetic rutile plants as well as by the Kwinana pigments plant. Under the DWER administered Licence L5319/1988/12. The nature of the materials disposed of must be solid i.e. 'spadeable'.

Mining and processing operations at Cooljarloo were established in accordance with the Mineral Sands (Cooljarloo) Mining and Processing Agreement Act 1988. An act of the parliament of Western Australia. Annual reporting of compliance with these conditions is undertaken. A further assessment in relation to the Cooljarloo operations - the Cooljarloo West Titanium Minerals Project - is currently underway.

Tronox holds two Native Title Agreements under the Commonwealth's Native Title Act 1993. Both agreements are with the Yued Native Title Claimant group and relate to the Falcon extension area (reached in 2006) and Cooljarloo West (reached in 2015). These agreements include commitments for the protection of heritage, provision of training/education, business opportunities, and the formation of a facilitation committee and the development of a cultural awareness programme for Tronox staff. Costs are modest and immaterial to the business.

Mine Closure

Cooljarloo future mine path is predominantly situated on Unallocated Crown Land (UCL) comprising native vegetation occasionally used for bee keeping or flower and seed picking. Tronox has determined, in consultation with key stakeholders that the UCL within the Mining Lease will be rehabilitated back to a state that is broadly representative of native vegetation communities. The 1040 Ha Mullering Farm is owned by Tronox and will rehabilitate this freehold land to mixed agriculture land-use after mining.

The closure provision is established on the basis of estimates, which include the closure and rehabilitation costs to be incurred after mining operations have ceased. The closure provision represents the present value of the future estimated mine closure cost which is reviewed by management each year. The latest cost estimate was completed in 2021.

In 2020 the combination of the cessation of the Cooljarloo Act and the replacement with Mining Lease 70/1398. Tronox became required to lodge a sum of approximately US$280k to a State-wide Mining Rehabilitation fund, imposed by government. This is an annual fee based on an open area of the active mine at Cooljarloo and used to fund the rehabilitation of legacy mined out areas around the State of Western Australia and has nothing to do with Tronox rehabilitation performance, which is in good standing. The total of the mine closure provision is currently estimated to be US$34M in real terms.

18 Capital and Operating Cost

As the operation commenced in 1989 the project capital is no longer a relevant factor in determining the economic viability of the property. However the economic analysis allows for ongoing minor stay in business capital and also a pre-feasibility estimate of a range of US$40 to US$70 million for the Cooljarloo West mine extension project. The operating costs are known and no longer subject to estimate. Costs used in the economic analysis come from Tronox internal cost accounting systems.

19 Economic Analysis

For the financial modelling that supports the current Reserves, a range of mining block schedules are prepared by the senior mine development engineer. These schedules contain information on ore tonnes and grades, mineral assemblages, predicted product qualities, clay fines levels as well as other information that may impact on throughputs, recoveries and costs. Whilst the resource modelling is done on the basis of approximate potential revenues and costs likely to be incurred, the financial modelling is a more detailed second iteration. Historical performance validated forecasting models have been used to predict a range of physical performance parameters for future ore blocks to be mined over the remaining life that are used as input drivers to the financial modelling and economic validation. Grouped cost drivers, physical and revenue parameters used in the modelling.

There are many mineral sands mines operating worldwide. Many as standalone mineral sales operations producing mineral products similar to those emanating from Cooljarloo. With so many operations selling titanium and zircon mineral products on the open market Tronox chooses to value its ore reserves on the basis of what it would have to pay to buy the mineral products, if it didn't produce and use them itself. Mineral pricing data is readily available through a number of industry sources and from Tronox own marketing team.

The current Cooljarloo orebody is expected to be depleted by 2033 at which time the dredge mining operation will progress to Cooljarloo West and spend a further 7 years mining that deposit.

Key cost assumptions, macro and mineral price assumptions:

To determine the economic viability and cash flows of the Cooljarloo project, the Company utilized management's best estimates of the following key assumptions for the mining operations: 1) overburden removal cost, 2) plant variable cost, 3) concentrator fixed costs, 4) tailings fixed costs, and 5) maintenance, overhead and support services costs; and for the separation plant, the assumptions are as follows: 1) plant variable costs, 2) MSP fixed costs, 3) HMC haulage rates and 4) maintenance, overhead and support services. Other key assumptions were mineral royalties, distribution costs, mine and concentrator and MSP capital spending, tax rates, and exchange rates. Cash flows are positive for all years in the Life of Mine Plan out to 2040.

The physical mining and processing parameters used in the life of mine plan and applicable to exploiting the reserves result in a mine life of 19 years and product yields from in ground mineral to saleable products as follows:

- Ilmenite 83%
- Rutile 94%
- Leucoxene 66%
- Zircon 80%

Sensitivity analyses were conducted using variants such as commodity price, operating costs, capital costs, ore grade and exchange rates. As a result of these analyses, the project was determined to be economically viable in all scenarios.

20 Adjacent Properties

Not applicable.

21 Other Relevant Data and Information

- Glossary of Terms summarised in Table 6.

Table 6: Glossary of Terms

Symbol	Description
AC	Air Core drilling
DMIRS	Department of Mines, Industry Regulation and Safety
DTM	Digital Terrain Model
DWER	Department of Water and Environmental Regulation
CPI	Consumer Price Index a measure of inflation
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
GPS	Global Positioning System
HMC	Heavy Mineral Concentrate
HM	Heavy Minerals
HT Roll	A high voltage electric charging mineral separator
JORC Code	Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves
LOMP	Life of Mine Plan
MA98	Tronox Method of determining mineral assemblage using XRF and algorithms
Mbcm	Millions of bank cubic metres
ML	Mining Lease
MSP	Mineral Separation Plant
Mt	Million tonnes
MWh	Mega Watt Hour, a unit of electricity consumption
Neighbourhood Analysis	Method of classifying multivariate data according to a given distance, provides optimal parameters for modelling.
NYSE	New York Stock Exchange
DFS	Definitive Feasibility study
QA/QC	Quality Assurance/Quality Control
QEMSCAN	Quantitative. Evaluation of Materials by Scanning. Electron Microscopy
Clay Fines	Industry term defined in Tronox as material passing a 63 µm sieve and generically meaning “clay and silt suspended in water”.
Strandline	Line of concentrated heavy minerals usually associated with historical shorelines
THM	Total Heavy Minerals
VHM	Valuable Heavy Minerals (total of Ilmenite+Rutile+Leucoxene+Zircon)
XRF	X-ray fluorescent Analysis
Yield	The recovered weight of material to a saleable product

22 Interpretation and Conclusions

The declaration that the Cooljarloo operations have 361Mt of ore reserve at 1.8% HM grade and resources of 292Mt and 1.5% HM grade is well supported.

The mineralization in the deposit varies relatively gently in lateral dimensions. The basement material is often mineralized as well, and the overburden sands also mineralized often only marginally below cut-off grade. Although the deposit is low grade by world standards, parameters like the drill hole spacing generally being much closer than variogram distances, the metre-by-metre downhole analysis, the attention paid to domain composites in which the analysis partially mimics the production process,

the accuracy of analytical checks and the reconciliation between plan grade forecasts and actual grade mined and processed all provide solid support for there being a low margin for error.

The minerals in the deposit are relatively clean with limited existence of inclusions and composite grains. This all supports the high recoveries observed in processing.

The product qualities are excellent with the high TiO2 ilmenite being suited for synthetic rutile production, the rutile and leucoxene suited to direct use in chloride pigment processes that Tronox predominantly operates and the zircon well regarded for use in ceramics.

Cooljarloo has a good record for rehabilitation of past mining areas, groundwater management, control of dust and radiation management. Relationships with key stakeholders and government regulators are also in good standing. The LOMP runs through to 2040, with closure and rehabilitation plans and financial provisions being made.

On a mineral only basis, financial modelling shows that future reserves are profitably mineable with the existing equipment and infrastructure.

The Cooljarloo operations are a key part of the Tronox vertically integrated pigment production process.

23 Recommendations

That geological work continues to better define the economic margins of the resources, looking for inclusion, at least in part, as reserves to further extend mine life.

24 References

List of References summarised in Table 7.

Table 7: List of References

Title
Cooljarloo Heavy Mineral Sands Project Definitive Feasibility Study 1988
Tronox Northern Operations 2021 Annual Resources and Reserves Report
Cooljarloo Mineral Sands Mining Proposal – February 2020
Tronox Mineral Sands Mine Closure Plan – February 2020
South Mine Step Change Project DFS 2010

25 Reliance on information provided by the registrant

The preparation of this Technical Summary Report relies on information provided by Tronox and its employees in the following areas, as they are reasonably outside the expertise of the qualified persons.

- Marketing plans and pricing forecasts as key inputs to the economic modelling.
- Environmental performance commitments and mine closure costing
- Maintenance of licenses and other government approvals required to sustain the LOMP
- Capital to progress the mining of the Cooljarloo West deposits

At least one of the qualified persons has functional knowledge of current sales prices and has been involved in economic analysis, at a strategic level, of third-party projects. But there has been no direct engagement in the determination of macro forecast parameters.

Similarly at least one of the qualified persons has had direct involvement with historical rehabilitation practices but there has been no direct involvement with the mine closure costing estimate nor the post land forming rehabilitation and regulatory commitments

Whilst at least one of the qualified persons has been engaged with the plan to relocate to Cooljarloo West and engaged in estimating the financial worth of that mine life extension, it is assumed that funds will be available to enact the plan when the time comes.

26 Date and Signature Page

This report titled “Cooljarloo Technical Report Summary” with an effective date of December 31, 2021 was prepared and signed by:

/s/ Paul Stevenson

Paul Stevenson, Manager Minerals Resource Development
Dated at Muchea, Western Australia
February 22, 2022

Atlas-Campaspe Technical Report Summary

1 Executive Summary

The Atlas-Campaspe Project is currently under construction and will replace production from the existing Crayfish, Ginkgo and Snapper mining operations in New South Wales.

Heavy Mineral Concentrate (HMC) produced at the Atlas and Campaspe mines will be transported by road train and rail to the existing mineral separation plant (MSP) at Broken Hill. As it does now, the Broken Hill MSP will produce a non-magnetic concentrate which is then transported by rail and subsequently shipped to Bunbury in Western Australia for processing at the North Shore MSP into rutile, zircon and leucoxene products. The Broken Hill MSP will also produce a range of ilmenite products. Atlas and Campaspe are situated on an historical coastline and made up of conventional mineral sands strandlines. The deposits are eminently suited to standard dry mining techniques and gravity mineral concentration. There is one Mining Lease and the Atlas Campaspe Mineral Sands Development Consent held 100% by Tronox Mining Australia Ltd., a wholly owned subsidiary of the Company.

The current reserves are 107Mt at 6.3% HM giving an 11 year mine life. The resources, additional to the reserve tonnage, are 114Mt at 3.0% HM.

2 Introduction

This report has been prepared by Tronox Holdings Plc in compliance with the US Securities and Exchange Commission's modernisation of reporting rules for geological resources and reserves for the Atlas and Campaspe deposits located in New South Wales, Australia.

Information used to support this technical summary of the geology includes the annual Resources and Reserves report, the Definitive Feasibility Study and various other relevant study documents.

A Qualified Person visits the operating mine sites on at least a quarterly basis. Discussions with site management on resource utilisation and optimisation opportunities are also completed regularly. Visits to the drilling areas are also completed, at a minimum, on a quarterly basis.

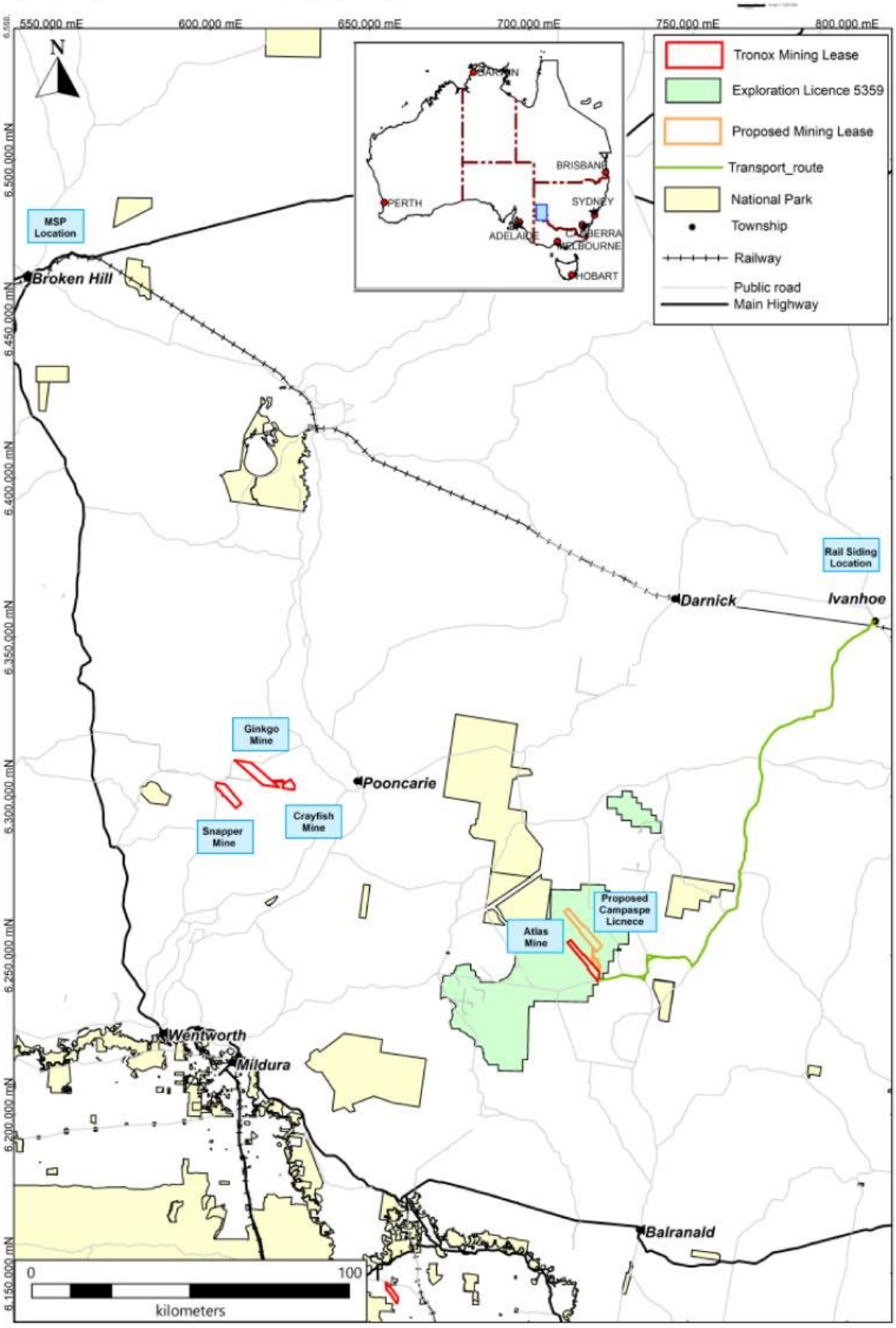
3 Property Description

Tronox Mining Australia Ltd is a subsidiary of Tronox Holdings plc and is the operator of Tronox Eastern Operations which includes:

- The Crayfish, Ginkgo and Snapper Mines, 110 kilometres north of Wentworth in southwestern New South Wales, where heavy mineral concentrates are currently produced from dredge mining operations;
- The Atlas-Campaspe project in southwestern New South Wales, 120 kilometres northeast of Mildura, where site development has commenced for future mining operations and also shown in Figure 1;
- Broken Hill Mineral Separation Plant in southwestern New South Wales, where the heavy mineral concentrates (HMC) are separated into mineral products;
- Adelaide Port space where bulk mineral sands products from Broken Hill are loaded for export and transhipment is leased.

See Figure 1 on next page.

Figure 1 Regional location of Atlas/Campaspe Project



Mining tenements in Australia are managed at the State or Territorial level. In New South Wales, Mining Leases, Exploration Licenses and Assessment Leases are granted and administered by the New South Wales Department of Primary Industries Mineral Resources Division.

The Development Consent for Atlas and Campaspe was granted in June 2014 and construction of the Atlas Project has commenced. The Atlas deposit is secured by Mining Lease 1767. The Campaspe deposit is secured by the Atlas/Campaspe Mineral Sands Project Development Consent SSD_5012 from the Government of New South Wales.

The minerals in New South Wales belong to the Crown (the State of NSW) and Tronox is obligated to pay a 4% revenue-based royalty on all saleable minerals produced.

All the land encompassing the intended mining area has been purchased by Tronox so no mining compensation payments to landowners will be required as part of the Atlas-Campaspe Project.

4 Accessibility

The project area comprises flat to undulating sandplains covered by a combination of grasslands, low woodlands and shrublands. The elevation ranges from approximately 100m Australian Height Datum (AHD) in the west to approximately 70m AHD in the east.

The southwestern region of NSW has a semi-arid climate. The project area is located in a persistently dry, arid climatic zone with mostly uniform rainfall distribution throughout the year. The average annual rainfall is 284 mm occurring over an average of 35 days in the year. Mild winters, hot summers and warm spring and autumn weather are typically experienced in the general region. The warmest month of the year is January, with an average maximum temperature of 33 °C. The coldest month is generally July with an average maximum temperature of 15 °C. Soils in the project area are considered stable and calcic with various layers and horizons. The region has a good road network of highways and both bitumen and unsealed local roads.

Infrastructure is disclosed in Item 14.

5 History

In the Murray Basin fine heavy mineral occurrences were identified from 1982 to 1986 by RioTinto. Subsequently many smaller, coarser and high-grade deposits were also located and these formed the first mineral sands mines to be developed in the region. Bemax Resources discovered the Ginkgo, Snapper and Crayfish deposits in the early to mid-2000's. Mining commenced at Ginkgo in 2005 and Snapper in 2010. These deposits are still being mined today by Tronox.

The Atlas-Campaspe Project is a further development to replace production from the existing Ginkgo and Snapper mining operations, which are expected to be mined until at least 2023.

6 Geological Setting, Mineralisation and Deposit

Regional Geology

The Murray Basin is a low-lying saucer-shaped basin defined by flat lying Cainozoic sediment, which extends over an area of 320,000 km^2 in New South Wales, Victoria and South Australia, surrounding the Murray River.

The tertiary Cainozoic sedimentary blanket is generally less than 200m to 300m thick. Only the sediments of the third depositional sequence are of any importance in the present exploration for mineral sand deposits. The third sequence, from Upper Miocene to Pliocene, is 0 to 250 m thick, and formed in an environment of fluvial flood plain to the east, flanking an extensive marine strand plain.

Atlas Geology

The Atlas resource is a continuous body of mineralisation approximately 15km long and up to 150m wide with an average thickness of 6m. The southern 12km is planned to be mined with HM grade decreasing to the north. A typical cross section is shown in Figure 2 on the next page.

The sedimentary package that hosts both the Atlas and Campaspe deposits is typical of most other mineral sands deposits in the Murray Basin, comprising:

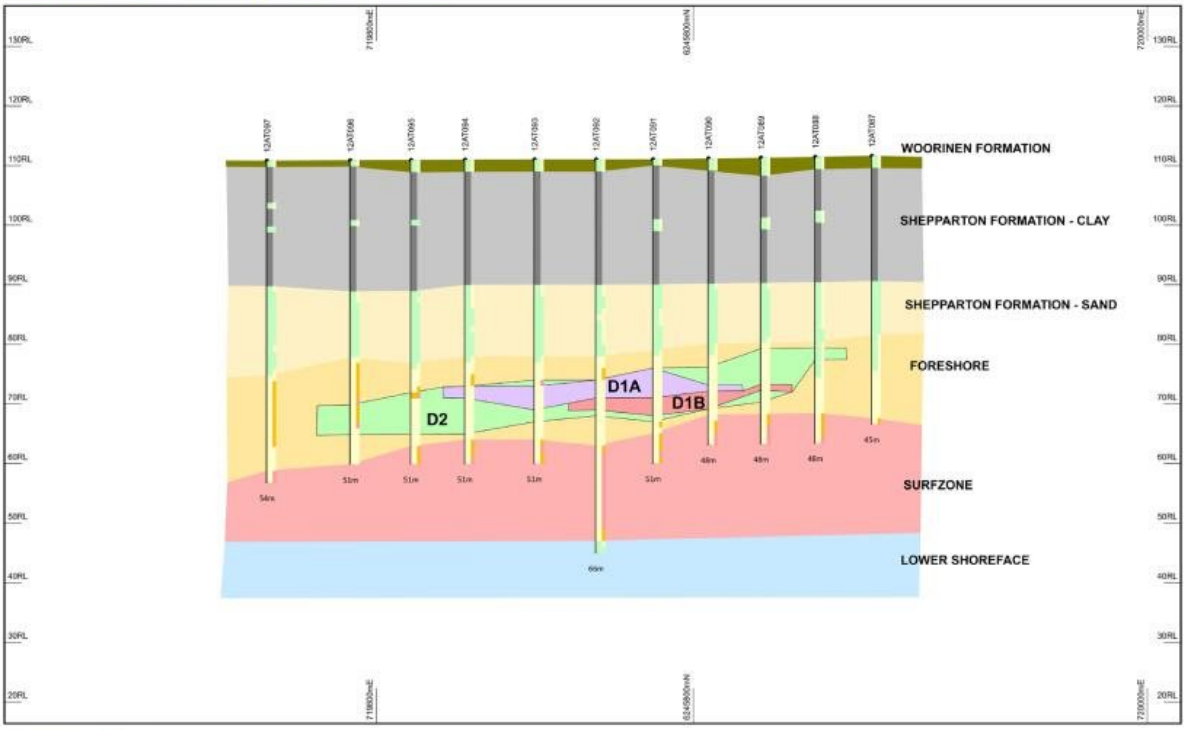
- Woorinen Formation (recent dunes);
- Shepparton Formation (terrigenous fluvio-lacustrine deposits); and
- Loxton Parilla Sand (littoral marine sediment) hosting the mineralisation.

A consistent high-grade domain, denoted Domain 1, occurs along the length of the deposit which is typically less than 100m wide. The deposit is overlain on average by 26m of overburden which consists of a thin 1- 3 m layer of the Woorinen sandy clay Formation and approximately 20m of Shepparton Formation, which consists of sandy clays and minor sand beds with mildly indurated zones.

Geological interpretation splits the high-grade Domain 1, which is defined by a 5% HM grade cut-off, into two sub-domains, 1A and 1B. Domain 1A has an average HM grade of 25.2%, with 17.2% rutile and 11.4% zircon in the HM. Domain 1B typically lies below and to the east of Domain 1A, has an average HM grade of 14.0% and contains 14.6% rutile and 7.7% zircon in the HM. Domain 2 is a lower grade envelope defined by a 1% HM grade cut-off.

The orebody dips 39m over 10km, before being faulted up near the northern extent of the ore reserve.

Figure 2: Atlas Deposit - Typical Cross Section

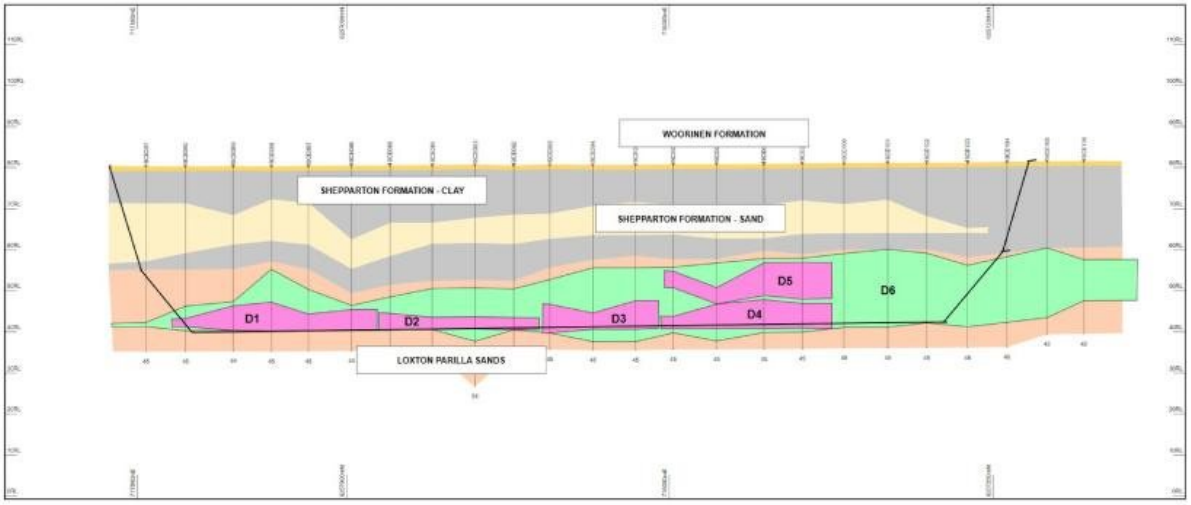


Campaspe Geology

The Campaspe mineralisation is over 20km long and averages 420m wide, defined by 1% HM grade cut-off. The mineralisation averages 12m in thickness. The deposit is shallowest at the south-eastern end, averaging less than 10m of overburden, but deepens to the north with an average overburden depth of 25m. The current plan is to restrict mining to the southern 13.5km of the deposit, up to the fault position at 21500mN. North of this position the mineralisation deepens significantly.

Geological interpretation of drill-hole and mineralogical data has delineated five high-grade domains within a broad lower-grade envelope. A typical cross section is shown in Figure 3 below.

Figure 3: Campaspe Deposit - Typical Cross Section



The resource estimate is in part Measured (100m and 200m spaced drilling) and Indicated (400m spaced drilling) south of the 21500mN fault position, and all Inferred (800m spaced drilling) north of that position, none of which is considered in the current life of mine plans.

The overburden consists of a 1m to 6m layer of the Woorinen Formation, consisting of clayey, poorly sorted sands, and an average of 20m of the Shepparton formation consisting of interbedded clays, sands and silts. The thickness of the overburden increases northwards. The Loxton Parilla Sand, hosting the mineralisation, is a fine-to mediumgrained, very well sorted beach sand that averages only 2% clay.

The mineralised domains across the deposit are quite variable and represent past beaches and dunes. Domain 1, located on the western side, is the highest-grade beach. Domain 1 is approximately 60m wide and 6m thick, with an average grade of 12.4% HM containing 11.4% rutile and 14.6% zircon. Domains 1 to 4 are broadly based on a 5% HM grade cut-off, whereas Domain 5 is a higher-grade dune with a 3% HM grade cut-off. These high-grade domains can be traced along the length of the deposit. Domain 6 is the halo of low-grade mineralization defined by a 1% HM grade cut-off.

The deposit is at surface at the southern end and is predominantly above the water table. The deposit dips northward with the base of deposit dipping below the water table.

The most obvious post-depositional structural modification is a significant down-throw of the stratigraphy and mineralisation by approximately 30m at 21500mN. The current mine plan ends at this northern down-throw.

7 Exploration

There is no relevant exploration work to disclose.

8 Sample Preparation, Analyses and Security

Drilling and Sampling

Reverse circulation “aircore” drilling is completed using a Landcruiser or small truck mounted drill. This style of drilling suits the soft sand ground conditions and the drilling is relatively shallow (40-60m) and very rapid (60 minutes per hole).

Holes are drilled vertically using three metre NQ size rods, giving a nominal hole diameter at the bit of 83 mm. Drill samples are collected in one metre continuous intervals from surface. The drill sample return is captured through a cyclone to separate the air and reduce sand/slurry velocity which is then passed through a rotary splitter. All samples are sent to a Tronox internal laboratory for heavy mineral analysis by Lithium Heteropoly Tungstate (LST), SG 2.85.

Figure 4 shows the drilling density over the interpreted strandlines at Atlas and Campaspe that form part of the future mine plan.

Logging

Geological data is collected during the drilling and sampling process to accurately log the different stratigraphic units, and to differentiate the Loxton-Parilla Sands host horizon from the generally un-mineralised Shepparton Sands sequence. The data is also used to help discretise domains.

The logging is commenced from surface at 1m intervals until the end of the hole.

A measured sub-sample for each metre of the Shepparton Formation Sands/Loxton-Parilla Sands is washed and separated into a mineral concentrate by panning and the amount of HM is visually estimated. Data collected for each metre includes lithology, sample colour, sorting, grainsize, cement type, colour, an estimation of HM, clay fines and hardness; additional comments such as the observation of trash minerals (i.e. garnet) or the water table are also noted.

Heavy Mineral Analyses

Samples from the field, once dried and crushed, get screened at 2mm to remove oversize, a 70g split is attritioned in water and wet screened at 53 microns to remove silt and clay. The deslimed portion is stirred into a separating funnel of LST solution to split the heavy minerals at 2.85 SG from the floats, mostly quartz. The weight of washed HM sinks are then used to calculate the heavy mineral content as a percentage of the original sample weight (HM%).

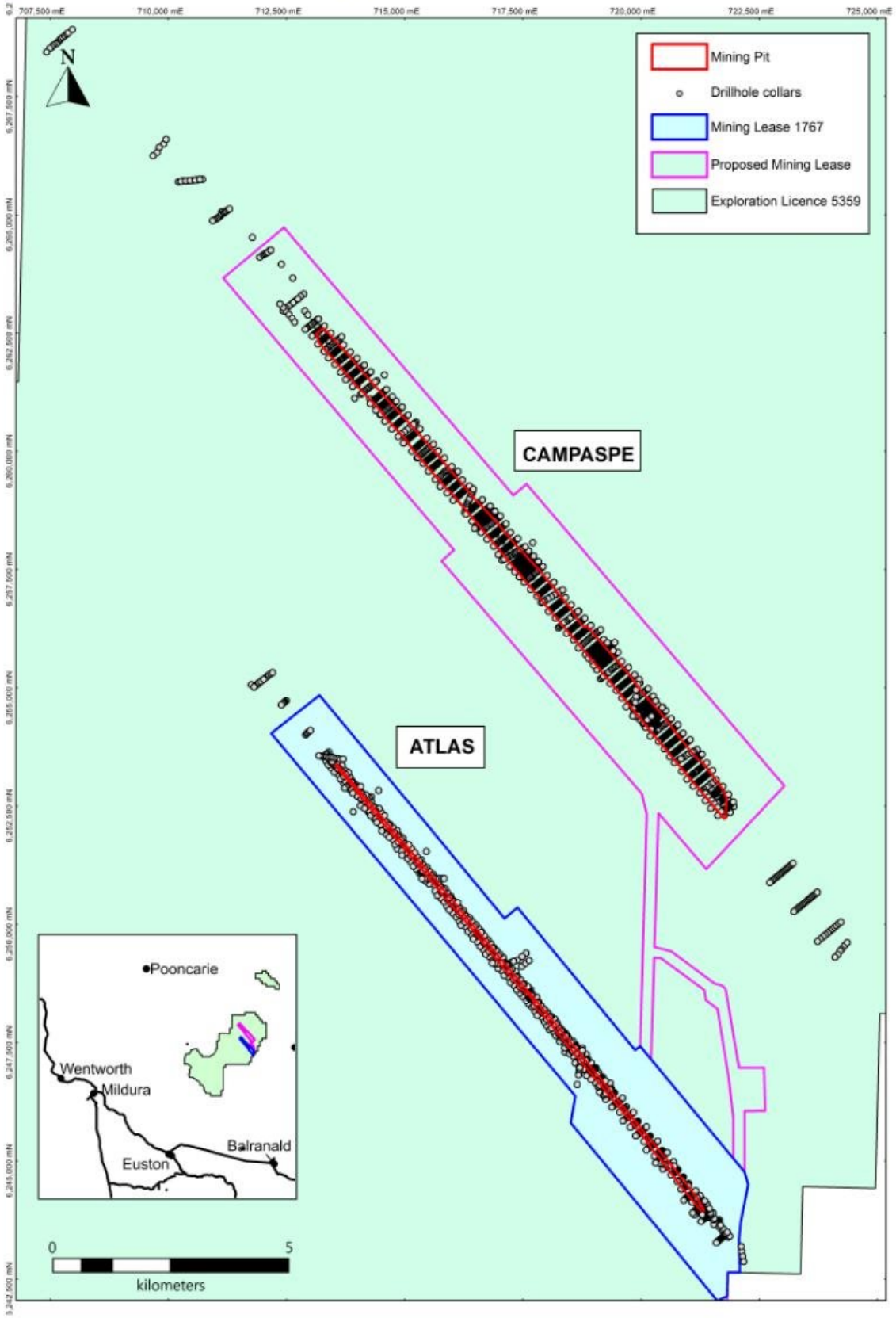
Assay data is returned from Tronox’s Broken Hill laboratory in digital format and merged into a relational database.

Mineralogical Analyses

Tronox Eastern Operations uses a mineralogical analysis technique which is a combination of XRF oxide analysis and scanning electron microscopy to identify minerals.

The process is undertaken typically on composited HM sinks derived from LST Analyses. Mineralogy from distinct geological domains or strands is generally consistent across an orebody, so retained HM sinks from similar geological domains and strands can be composited together to create mineralogical composites. The XRF analysis requires 3 – 5 grams of material and the electron microscopy scanning process requires 10 grams of material. As such, a minimum of 15 grams is sent off for mineralogical assessment, at SGS in Perth.

Figure 4 : Drill Holes over the Atlas and Campaspe Resource

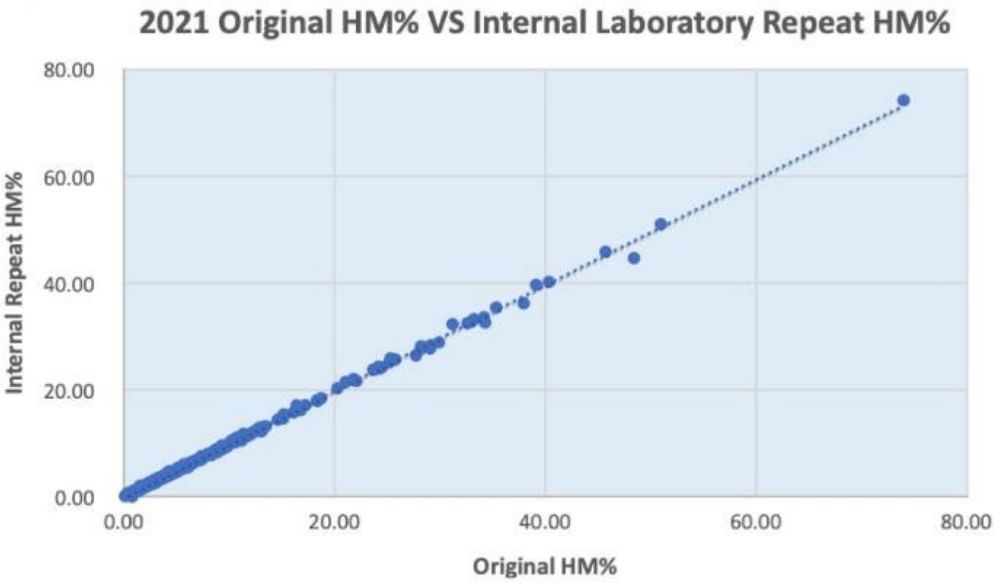


9 Data Verification

Laboratory triplicates are undertaken at a rate of one in every hole drilled. The process involves a triplicate sample being collected during the initial laboratory sample splitting process.

A total of 524 triplicate samples were completed in the Murray Basin during 2021. Triplicate samples consist of an original split, a duplicate split for internal analysis and a third for external analysis. Scatterplots are shown below in Figure 5 and Figure 6.

Figure 5: Scatterplot Original split HM% compared with internal split HM%

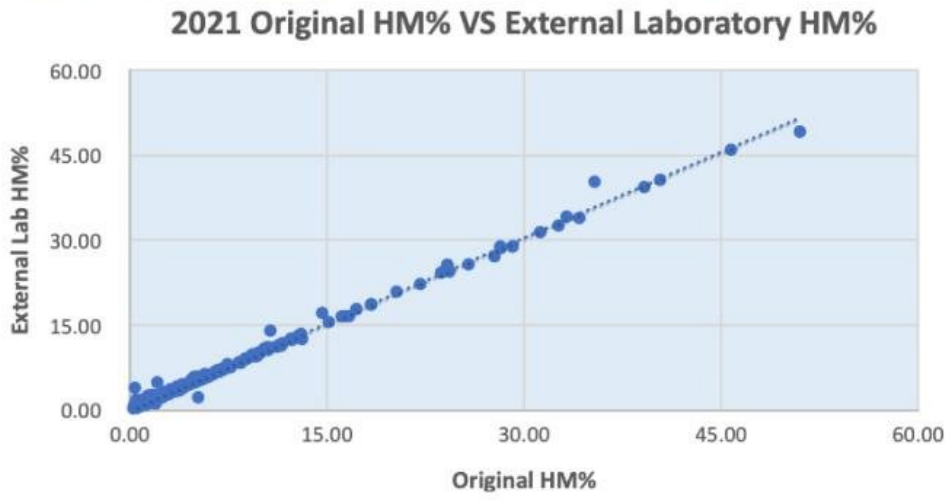


The heavy mineral internal comparison shows excellent correlation. No systematic errors or biases were noted during the reporting period.

Both the internal and external comparisons show excellent correlation with the original split analysis.

The Qualified Person considers the data validation confirms that the accuracy of the mineralisation assays is in line with industry standards and is suitable to support estimates of Resources and Reserves.

Figure 6: Scatterplot Original HM% compared with External Laboratory HM%



10 Mineral Processing and Metallurgical Testing

Atlas Metallurgical Testing

Extensive metallurgical samples have been collected across the entire Atlas deposit from 2011 through to 2016. Forty-five samples based on drilling composites through to 1 tonne bulk samples have been processed at pilot scale to give recovery and mineral quality information.

Further test work was also undertaken on 2018 bulk samples to enable plant optimisation work. The results of this work, in combination with the Atlas short term mine grade variability, enabled the operational ranges and control philosophy to be defined and incorporated into the design of the wet concentration plant (WCP).

Test work to investigate the option of Dry HMC processing at Broken Hill rather than using current WHIMS separation prior to processing the magnetic fractions separately was undertaken in 2018. This work was conducted at a pilot plant scale and as a plant trial. These studies concluded that dry processing was the preferred option. The benefits of dry processing arise from the improved separation of products at Broken Hill and the reduced transport of lower value product to Bunbury.

The metallurgical test programmes were primarily conducted at Tronox North Shore and the Broken Hill metallurgical testing facilities by experienced in house personnel.

Campaspe Metallurgical Testing

Extensive metallurgical samples have been collected across the entire Campaspe deposit. Six large composites from drilling defined areas were constructed. A further 31 composites from previous drilling on the standard grid were also compiled.

Test work was done primarily at the Tronox North Shore metallurgical testing facilities in Bunbury WA.

Product quality observations apparent from the test work on both Atlas and Campaspe are:

- Elevated Cr_2O_3 in the ilmenite products, but no higher than that experienced at the current Ginkgo and Snapper ore bodies, the impact of which is easily managed by blending with other feedstocks used in Tronox vertically integrated pigment production facilities.
- Elevated Fe_2O_3 levels in zircon from Atlas are modest and can be managed by mine planning and blending. At Campaspe the levels are somewhat higher and can be substantially eliminated by acid leaching or accepting a modest price penalty.
- Elevated levels of SnO_2 in rutile produced from Campaspe can be managed by screening the fine cassiterite out and blending with other pigment feedstocks in Tronox pigment plants.

11 Mineral Resource Estimates

Resources at Atlas and Campaspe are modelled using ellipsoid inverse distance squared weighting.

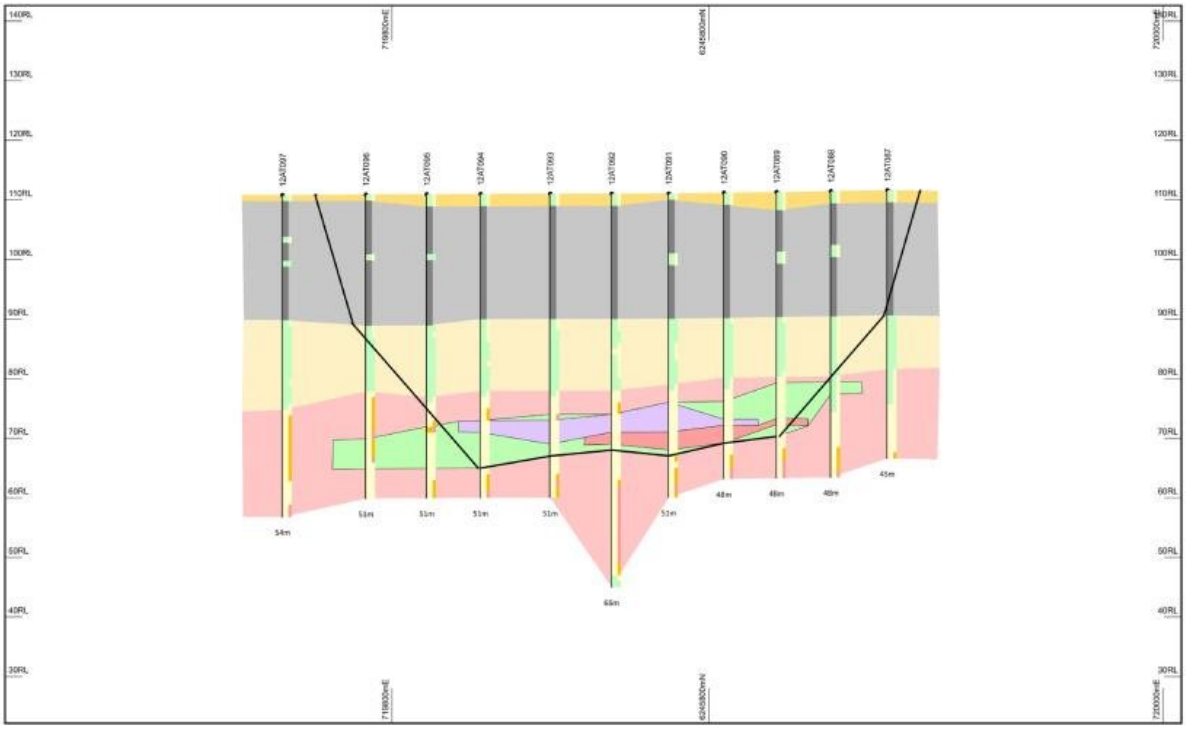
The models contain estimates of all valuable minerals and all the deleterious trash minerals and metallurgical recovery factors such as grain sizing. These are then uploaded into the scheduling software, Minesched and finally uploaded into forecasting software, SAP.

The dates of the Mineral Resource and Reserve estimates for Atlas and Campaspe, and shown in this Technical Summary, are as of December 31, 2021.

Geological Modelling

A model of the different geological domains is generated using Surpac software. Geological and assay data collected during logging are displayed on graphical sections and unit boundaries/layers are digitised at regularly spaced intervals in a north-south sectional orientation, depending on the location and drill spacing. The digitised strings are then joined together to create Surpac surfaces (DTM). Geological layers are created for any relevant and continuous geological features such as clay layers, basement layers and layers of induration. These layers are used during the estimation process of the “Background” material, that is, the material not bound by interpreted strandlines or mineralised zones. These layers represent major geological changes that occur downhole and ensure that the data used to estimate blocks comes from similar geological domains. See Figure 7 on the next page.

Figure 7: Geological Layers and Interpreted Orebody Section at Atlas 4,100mN



Interpretations of the mineralised domains are generated in a very similar manner to the geological surfaces and wireframed to created 3-dimensional bodies encompassing mineralisation at designated cut-off grades or representing particular mineralogical characteristics. For the Murray Basin deposits, a nominal cut-off grade of >1% HM is generally applied in order to create realistic shaped mineralised zones for estimation. These domains are later used to constrain block model grades.

Block Model Construction

Block models are created in Surpac using a parent block size that is generally half of the drill spacing. This is consistent with industry standards. Regular sub-celling for the block model is employed at domain boundaries to allow adequate representation of the domain geometry and volume. The sub-cell size is typically half the parent block size.

Grade Estimation and Domain Control

Each block within the block model and each composite within the composite database have been assigned a domain code for each of the domains. The estimation of block grades is completed using the domain codes and applied hard boundaries to all domains. Inverse Distance Squared (ID2) was undertaken for heavy mineral, slimes and oversize. Mineral assemblage data is estimated using Nearest Neighbour.

Generally, one or two passes were undertaken for all domains however, where drill data is sparse third or fourth estimation passes were undertaken. Occasionally, estimation passes use other data from neighbouring domains where full estimation was difficult. This usually occurs on the third or fourth passes only. Search distances and parameters applied during the nearest neighbour estimation of the mineralogical elements are generally required to be more generous due to the sparser nature of the data.

High-grade capping

No high-grade capping is applied to resource estimations in the Murray Basin because other estimation parameters are used to manage the influence of extreme high values.

Density

A bulk density formula of 1.62 + (HM% x 0.01) has been used for the Atlas and Campaspe resource models. This formula is based on 27 in-situ nuclear probe samples and is considered appropriate for deposits of this nature. Further bulk density testing is planned prior to commencement of operations.

Block Model Validation

Block grade estimates are validated by statistical analysis and visual comparison to the input drillhole data. Visual validation is completed by cutting sections through the block model at distances equal to the drill spacing and comparing the block model estimated grade to the drillhole assay data.

Statistical validation is completed by the comparison of the mean estimated grades to the mean grade of the input composite data grouped by domain.

Optimisation

The optimisation process uses mining and revenue parameters to generate a mining outline based on accumulating cash positive subset areas within the block model. A cash positive area is where revenue from dry mill products exceeds the cost of mining that area and processing the resultant concentrate.

The optimisation process is repeated using different revenue factors to create a series of nested shells.

The top of ore and bottom of ore surfaces are created for each of the revenue factors. These are then run through Surpac again to generate tonnes and grade, whilst ensuring that mined out and sterilised areas are removed from the tonnes. Mining block sequences are created for each of the shells ore tonnes and mineral assemblage information as well as mining and processing costs.

Modifying Factors

In the resource optimisation, modifying factors including recoveries, ore loss assumptions, operating costs and mineral sales pricing are used to seek the maximum value for a column of mineralization.

Cut-Off Grades

The long term mine plan and reserve estimates are derived from detailed techno-economic models created from geological, mining and analytical databases, and optimized with respect to anticipated revenues, and costs. Cost assumptions are developed from our extensive operating experience at Ginkgo and Snapper as well as from other Tronox sites and include mining parameters, processing performance, and rehabilitation costs. Predicted mining and processing metrics are reconciled with actual production and recovery data on a monthly basis.

Models are updated as necessary and used to determine ore boundaries based on economic assumptions.

The nominal cut-off grades used to calculate ore reserves are generally 1.0% HM. Actual cut-off grades applied in reserve estimates can vary slightly according to a number of factors, such as overburden: ore ratios and HM assemblage quality.

Classification of Resources is based on:

- Drill density
- Survey method and accuracy
- Drilling method and sampling interval
- Continuity of mineralisation and geological units
- Reliability of assay method and mineralogical information
- Frequency and results of QA/QC data
- Initial financial assessment from optimisation
- Tronox relies on constraining grade variation by drilling on progressively tighter grid patterns.

Initial exploration results for Inferred resources will generally be reported on a drill hole grid spacing of 1,600m x 80m or as access allows. All holes are sampled at 1m intervals. For the style of mineralisation being investigated (strandlines), this will generally produce three or four line intercepts which confirms approximate width and strike but may be open ended.

Indicated Resources will generally be reported based on an 800 x 40m grid or 400 x 20m grid. This will generally constrain the strands limits, confirm strike across several line intercepts and provide good confidence of grade continuity.

Measured Resources use a 200 x 20m grid, 100 x 20m grid or a 50m x 20m grid with 10m infill near boundaries. Thinner, high-grade strands may require a closer spaced grid before being considered Measured. This will constrain volumes over many drill section intercepts, provide confident grade variation control over multiple internal populations and provide adequate lithological information to determine mining criteria.

XRF and Valuescan mineral assemblage assays are applied on both individual down hole composites and along section composites made up from multiple drillholes within the geological domain.

The initial financial assessment from optimisation, as well as grade tonnage curves, also aid in the classification of resources and reserves.

The categorisation of resources is made based on the judgements of the Qualified Person, in consultation with the Mining Development Engineer and Resource Geologist.

Tronox uses breakeven contribution as a guide to cut-off determination rather than just grade. This allows for the polymetallic nature of the resource and the broad mineralisation of surrounding areas. As costs change over time and long-term revenue values change, new reviews are conducted which may lead to a different shell becoming optimal.

A summary of Mineral Resources as of December 31, 2021 are included in Table 2 on the next page.

Table 2: Summary Mineral Resources as of December 31, 2021

Deposit	Mineral Resource Classification	Tonnes of Material (Mt)	Grade HM%	Tonnes of HM (kt)	Clay Fines Content (% of material)	Mineral Assemblage		
						Ilmenite +Leucoxene (% of HM)	Rutile (% of HM)	Zircon (% of HM)
Atlas	Measured	9	2.7	229	2.7	58	14	8
Campaspe	Measured	23	2.6	575	2.1	59	9	13
	Inferred	83	3.1	2,599	2.6	60	6	13
	Measured	**31**	**2.6**	**804**	**2.3**	**59**	**11**	**12**
	Indicated	**0**	**0.0**	**0**	**0.0**	**0**	**0**	**0**
	Inferred	**83**	**3.1**	**2,599**	**2.6**	**60**	**6**	**13**
Total Mineral Resources		**114**	**3.0**	**3,404**	**2.5**	**60**	**7**	**13**

**N.B. Resources are Exclusive of Mineral Reserves*

The Qualified Person considers the data validation and geological modelling processes in addition to monthly and annual reconciliations between forecast grades and actual mined grades from current operations at Ginkgo and Snapper where the same processes have been used confirms that the mineralisation estimates are in line with industry standards and is entirely suitable to support estimates of resources and reserves.

12 Mineral Reserve Estimates

Mineral reserves are subsets of resources having used the same modelling processes for resources, but with a higher financial outcome metric applied and a more rigorous application of modifying factors.

Table 3: Summary Mineral Reserves as of the 31st December 2021

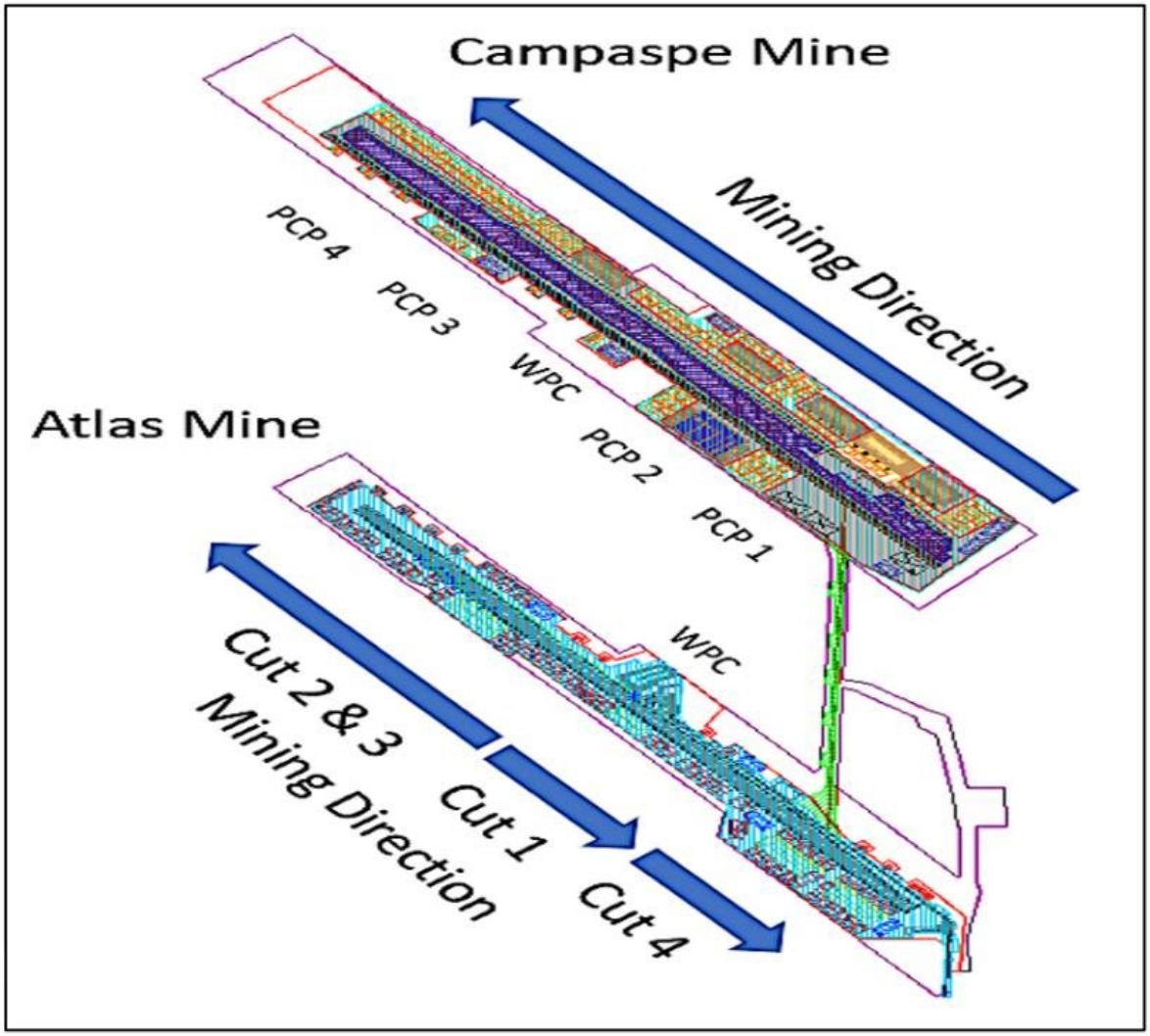
Deposit	Mineral Reserve Classification	Cut-off Grade (HM%)	Ore Tonnes (Mt)	Grade HM%	Tonnes of HM (kt)	Clay Fines Content (% of Ore)	Mineral Assemblage		
							Ilmenite + Leucoxene (% of HM)	Rutile (% of HM)	Zircon (% of HM)
Atlas	Proved	1.0	11.6	15.0	1,742	2.0	60.9	16.3	10.3
Campaspe	Proved	1.0	39.0	4.9	1,931	2.3	60.4	11.0	13.1
	Probable	1.0	56.5	5.4	3,052	2.3	60.3	10.0	13.1
	Proved	**1.0**	**50.6**	**7.3**	**3,674**	**2.3**	**60.6**	**13.5**	**11.8**
	Probable	**1.0**	**56.5**	**5.4**	**3,052**	**2.3**	**60.3**	**10.0**	**13.1**
Total Mineral Reserves		**1.0**	**107.1**	**6.3**	**6,725**	**2.3**	**60.5**	**11.9**	**12.4**

1) Mineral prices used in reserve estimation are substantially in line with the prices for each of our products, published quarterly by independent consulting companies
2) Conversion of in ground grade to saleable product yield, taking into account all of the losses in mining and processing, is for ilmenite typically 93%, for rutile 89%, for Leucoxene 109% and for zircon 75%

13 Mining Methods

Mining commences at Atlas for approximately 3 years. Mining will then transition to Campaspe, which will be mined for approximately 8 years. Average feed grade to the WCP varies between the Atlas and Campaspe deposits, with Atlas averaging 15.4% HM whilst Campaspe averages 5.2% HM. The nominal mining rate for each mine normalises annual HMC production. The Atlas and Campaspe orebodies will be mined in the sequence shown in Figure 8 on the next page.

Figure 8: Atlas-Campaspe Mining Sequence



Atlas Mine Plan

The Atlas deposit will be dry mined for both overburden and ore extraction. The WCP will be centrally located. Ore is to be trucked from the pit and delivered to the Dry Mining Unit (DMU), which will be periodically relocated along the mine path during the life-of-mine. Ore will be pumped from the DMU to the WCP for processing. Tailings will initially be placed off-path but will subsequently be placed on the mine path into the voids left behind as mining advances.

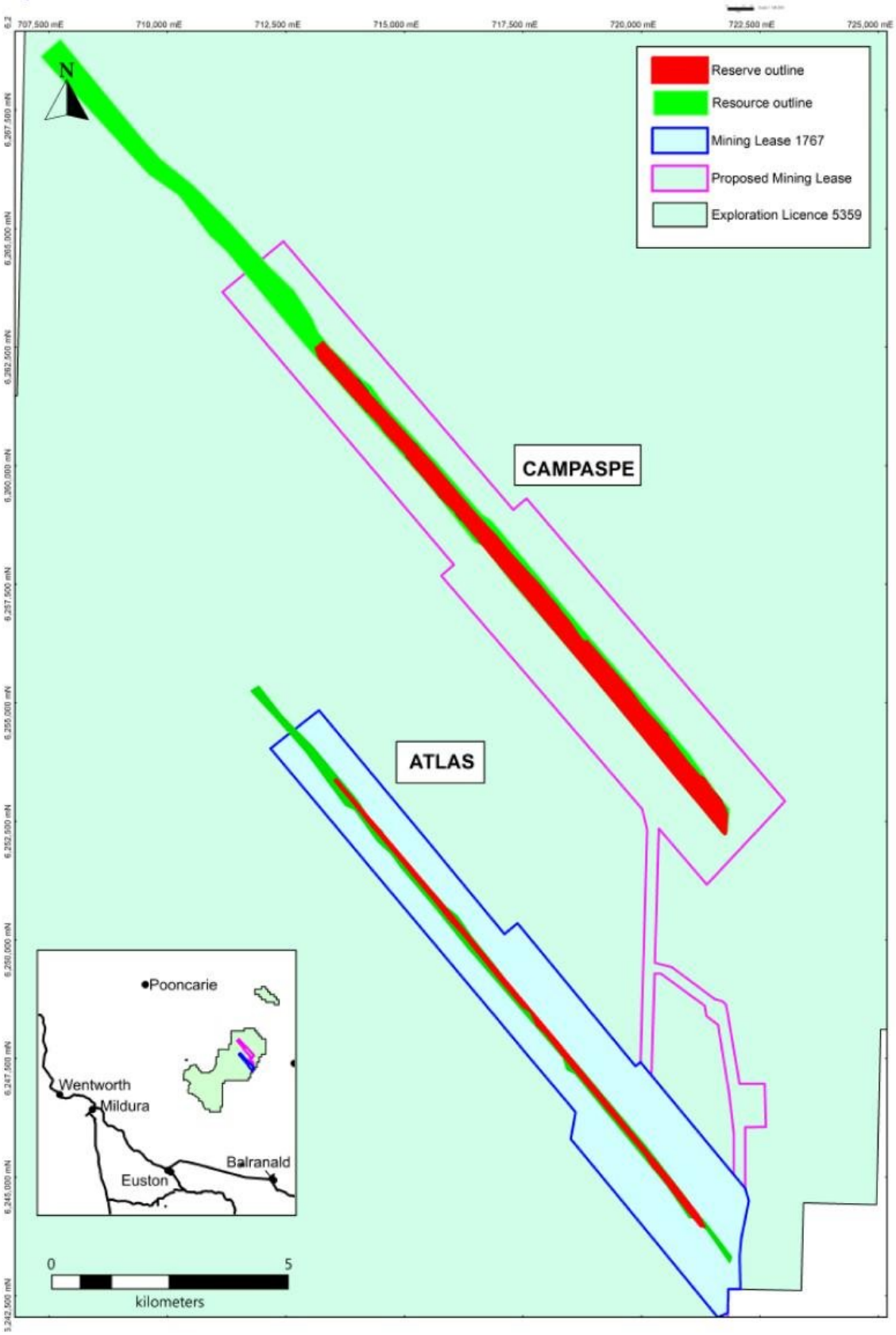
The start-up pit is to be located at the midpoint of the mine path. Selection of the startup pit location has been optimised to minimise the volume of the start-up pit and also to commence mining in higher grade ore in order to maximise initial production. The location of the start-up pit also has the advantage of being in close proximity to the WCP and associated process infrastructure during commissioning and ramp up of operations.

From the start-up pit, mining will advance towards the southern end of the mine path as shown in Figure 8 above. Mining to the south will be stopped immediately prior to the area of the deposit exhibiting elevated zircon iron staining at the southern end of the mine. Mining will resume from the start-up pit advancing north before completing the southern end of the mine.

Tailings produced during this initial mining stage will be pumped from the WCP to an Off-Path Tailings Dam (OPTD) until tailings can be accommodated in the voids left behind as mining advances along the mine path.

Figure 9 below shows that the resources clearly surround the mineable reserves and therefore the impact of ore dilution will be limited because of the significant grades in the resources.

Figure 9 Location of Resources relative to Reserves



The overburden at Atlas varies in both thickness and material type. The flexibility provided by truck and shovel operation is the best outcome for Atlas.

The northern portion of the central Atlas deposit dips into the water table. Dewatering of this area will be undertaken by means of in-pit sumps as mining advances towards this area.

Water supply for mining and processing will be derived from the natural water table as per the current arrangements at the Ginkgo and Snapper operations. The WCP will require a water supply of approximately 400L/s. Studies have shown water losses to tailings, evaporation, and mineral concentrate will be in the range of 200L/s to 250L/s. Make-up water requirements will require seven production water bores. For HMC washing and potable water, the highly saline bore water will be treated through a Reverse Osmosis (RO) plant.

Campaspe Mine Plan

At the conclusion of mining at Atlas, the Atlas WCP will be moved to a central location at Campaspe. A Primary Concentration Plant (PCP) will be added. Of ore fed to the PCP, 80% of material will be rejected to tailings and 20% will be pumped to the WCP as an upgraded (25% HM) concentrate for further processing. The PCP is designed to be relocatable and will be moved periodically to reduce pumping distances as mining progresses along the mine path. It is intended that the PCP will be relocated on three occasions.

Based on both grade variation along the deposit, highest at northern and southern extents of the deposit, and lower overburden at the southern end of the orebody, the best mining sequence is south to north. Commencement of mining at the southern end of the Campaspe deposit will reduce mining haul road and associated infrastructure requirements. It is planned to use the southern void at Atlas to reduce offpath overburden placement.

Redundant booster pumps and pipes from the Snapper and Ginkgo operations will be utilised at Campaspe.

Campaspe Overburden Mining Methodology

Removal of overburden to expose the ore will be undertaken using conventional bulk earth moving machinery. At the planned mining rate an average of 1.15 million bcm of overburden will be removed per year by excavators and trucks over an average haul distance of 1400m.

The overburden removal will be a 24/7 operation.

Campaspe Ore Mining Methodology

The wider and higher mining face at Campaspe is more suited to a dozer trap arrangement with in-pit pumping to the PCP located outside of the pit. Although advance rates at Atlas compel the mining unit to be located outside of the pit, at Campaspe the pit is much wider and advance rates are slower. Three moves of the PCP are planned along the length of the Campaspe deposit to optimise pumping costs.

The Campaspe ore face will be up to 18m thick, which is more favourable to dozer operation than conventional truck and shovel. The typical advance of the Campaspe ore face is estimated to be 150m per month.

The Campaspe deposit dips northward with the base of deposit dipping below the natural water table. Pit dewatering will be done to facilitate mining.

14 Processing and Recovery Methods

On Site Mineral Processing

For Atlas, the high variability in the ore grade and the narrow width of the mining face will require blending. Three blending stockpiles in combination with direct discharge of fresh ore from the pit will be wet screened at 4mm and undersize pumped as slurry to the WCP. A 3 stage spiral circuit is used to produce a 94% HM heavy mineral concentrate. The predominantly quartz tailings are returned to the pit while the HMC will be washed in a counter current cyclone circuit using RO water to remove salt. The wet HMC will be stockpiled and allowed to drain to minimise the water content before trucking to the Ivanhoe Rail Facility.

The spiral circuit will consist of rougher, middlings scavenger and cleaner stages of gravity separation spirals. A Super-concentrate stream from the roughers will be sent directly to the HMC sump as it is sufficiently high grade to by-pass the cleaner stage. There will be mass flow rate in-stream measurement to identify relative variation in ROM grade and be used to adjust plant throughputs accordingly.

Allowances have been made in the spiral circuit and overall WCP plant design to cater for a range of feed rates and densities to each stage of spirals based on expected feed grade variations.

Final HMC is densified through a cyclone tower. The clay content of the ore is low and when thickened will be co-disposed of with sand tailings

Processing of Campaspe ore requires a 4-stage plant. This will be achieved by combining the Atlas WCP with a newly built PCP, which provides the rougher circuit.

The thickening capacity will require upgrade. Field booster pumps and piping from Atlas will be re-used to pump between PCP and WCP while redundant boosters and piping from Ginkgo and Snapper will be used for ore and tails pumping. The PCP will be located close to the mining void, at natural surface and will be relocated four times over the life-of-mine, while the WCP is centrally located is only relocated once over the life-of-mine.

Downstream Processing

HMC is delivered to the existing Broken Hill site where it will be processed to produce ilmenite products and a non-magnetic concentrate. The ilmenite products will be distributed through the Adelaide port while the non-magnetic concentrate will be further processed to reject predominantly quartz before being transported to Bunbury, WA for additional processing to produce rutile, zircon and leucoxene products in the North Shore facilities.

Dry HMC Processing at Broken Hill

The current ilmenite circuit will be upgraded with new dry magnet technology that will give improved separation of the ilmenite type minerals. It will have the functionality to produce up to three grades of ilmenite products.

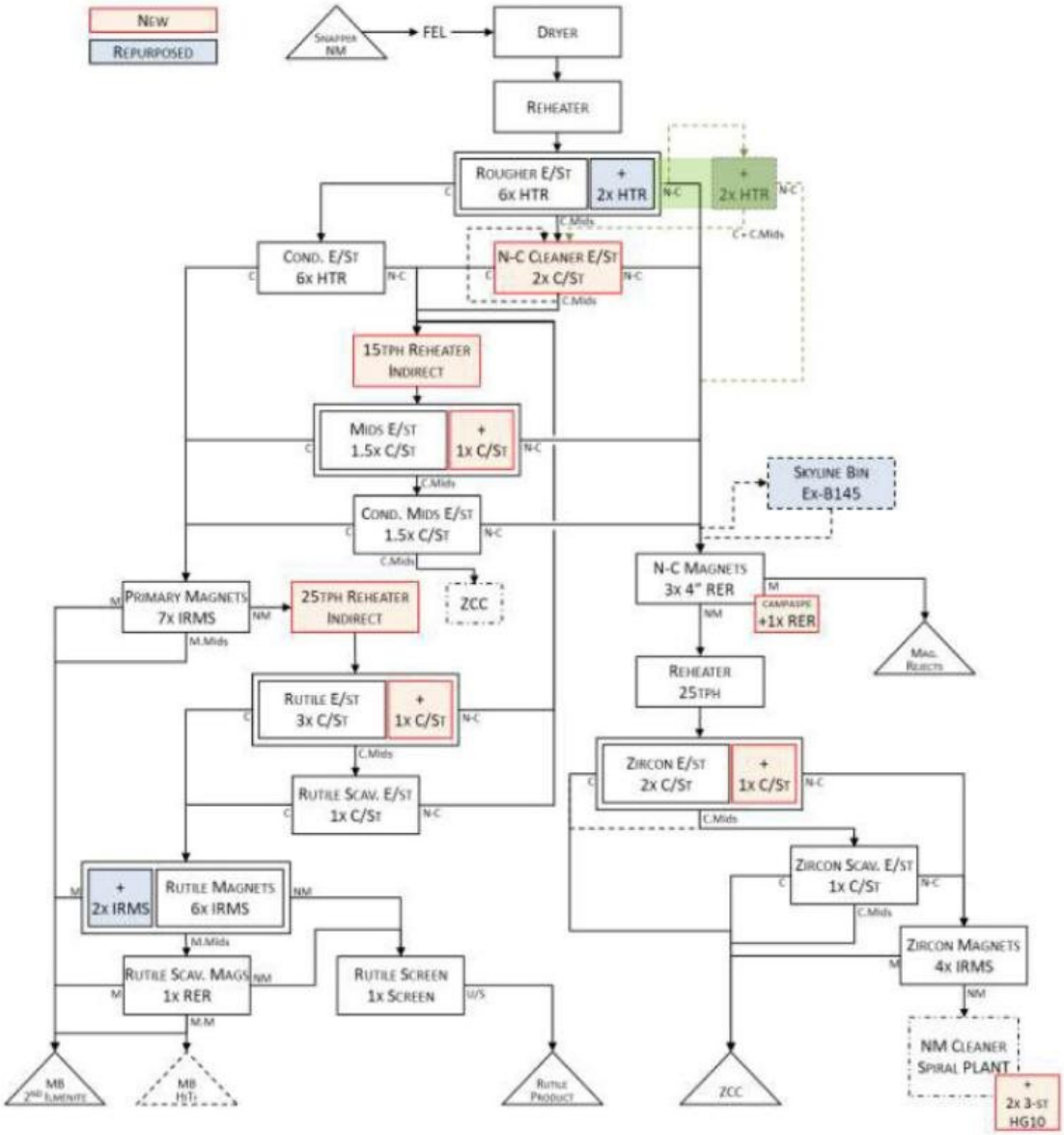
The non-magnetics produced from the dry HMC processing is further processed in a gravity circuit to reject residual quartz and low density HM trash minerals.

North Shore Processing

Once the non-magnetic concentrate is received at the existing North Shore plant in Bunbury WA it will be processed to make rutile and zircon products plus recover any altered ilmenite remaining. The plant will be upgraded to allow for the increased rutile percentage in the feed, increased processing depth due to iron staining and to improved zircon recovery.

Figure 10 below shows the flowsheet and modifications planned for the North Shore dry processing of Broken Hill non-magnetics.

Figure 10: North Shore MSP Dry Processing circuit



The typical final mineral product qualities emanating from the Broken Hill and North Shore MSP's are shown in table 4 below.

Table 4: Expected Typical Mineral Product Qualities

	Ilmenite BHT	Ilmenite BHI	Leucoxene	Rutile	Zircon
TiO2 %	56.0	60.7	69.6	94.0	0.12
Fe2O3 %	36.0	29.2	19.6	0.93	0.11
ZrO2 (inc HfO2) %	0.10	0.10	0.31	0.93	66.4
MnO2 %	1.06	1.14	0.66	0.01	-
Cr2O3%	1.01	0.92	0.36	0.14	-
SiO2 %	0.81	1.14	2.21	1.38	32.4
Al2O3 %	0.9	1.17	1.48	0.20	0.26
V2O5 %	0.22	0.23	0.29	0.20	-
U+Th ppm	67	100	230	60	470

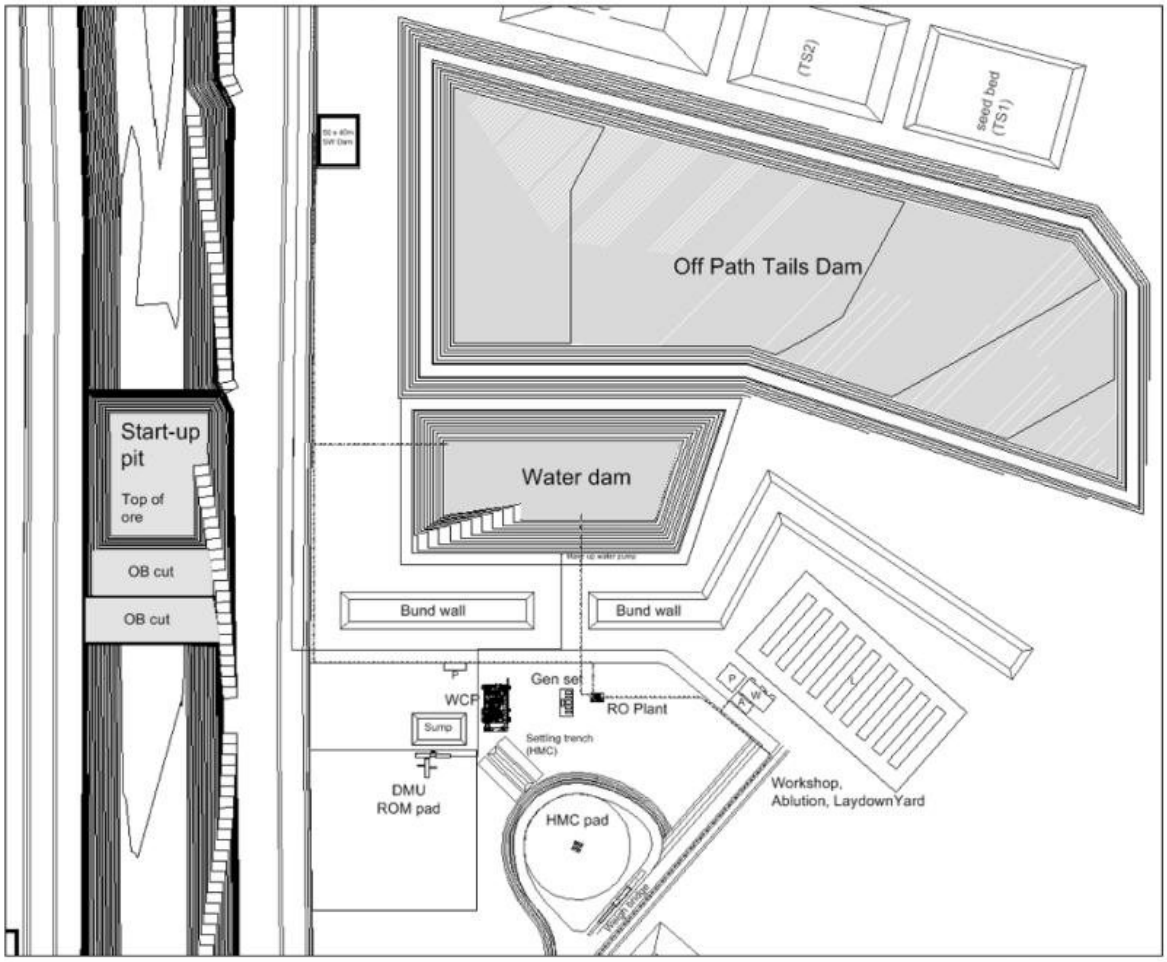
15 Infrastructure

Atlas Site Establishment Works

The Project Development Consent provides for an envelope within which vegetation clearing can occur following pre-clearance flora and fauna surveys. Clearing is undertaken by a bulldozer. Waste vegetation is stockpiled in windrows at the edge of clearing areas for reuse during post-mining rehabilitation. Topsoil and subsoil are being stripped and stockpiled separately for later use in rehabilitation.

The Atlas mining civils include the construction of a start-up pit, an OPTD and process water dam as shown in Figure 11 below.

Figure 11: Atlas Mining Civil Works Layout



The start-up pit is located directly west of the central processing area. A volume of 0.6Mbcm of overburden will be excavated and used to construct the OPTD.

The Atlas WCP is modular construction to allow for the offsite fabrication and preassembly of all structural elements to the greatest practical and economic extent. The structural design of the WCP caters for future relocation to Campaspe as a single plant, using self-propelled modular transporters.

An on-site 200 person accommodation village is to be constructed to house the workforce and the mine will require a number of permanent and demountable buildings and facilities such as: Administration and Office Building; Workshops; Process Area Crib Room and Amenities; and Main Store. Electrical power will be supplied directly from a centralized 5Mwh diesel generation system.

Hydrological investigations have identified a bore field location at the Northern end of the mine path that will be developed. Approximately 5km from the central start-up pit location it will supply water for the mining operations and ancillaries. Based on a test bore a total of seven bore pumps are required to supply the required volume.

A RO Plant and potable water treatment plant sized to deliver 115m3/hour is required to supply wash water for the HMC and potable water for site buildings, wash pads and accommodation village.

A communication building will be located adjacent to the communication tower for telecom and the Local Area Network (LAN). Data and telephone connection between the communications building, process area, administration area and accommodation aillage will be via a buried fibre optic cable.

To ensure that haul trucks comply with legal weight limitations when transporting HMC from the mines, a single axle 50t weigh bridge is to be installed at the HMC loading area.

A new rail siding and HMC stockpile facility will be constructed just outside at the township of Ivanhoe, approximately 140km northeast of the Atlas Mine, to allow despatch of Atlas HMC to Broken Hill for further processing. The HMC will be transported to Ivanhoe by Road Trains, and will be stockpiled for loading onto trains for rail transport to the Broken Hill MSP.

A 1.7km long rail siding will be constructed, connecting to the existing Interstate Rail Freight Network Parkes to Broken Hill line. The siding is sized to accommodate 66 wagons.

Campaspe Site

The development of the Campaspe site and required plant to operate includes:

- fencing of the mine lease (47km);
- construction of the access road (11km);
- construction of the mine corridor road (5.4km);
- construction of the process water dam (210,000m3);
- development of the mining pit;
- development of the bore field and water reticulation systems;
- relocation of workshops and amenities;
- expansion of the accommodation village from 200 to 300 beds;
- construction of a PCP;
- relocation of the Atlas WCP;
- relocation of Ginkgo/Snapper field booster pumps and piping;
- mobilisation of the Campaspe DMU;
- construction of the HMC pad and relocation of the Atlas HMC tower; and
- Upgrading of power generation to 7Mwh

DMU will be provided by the mining contractor. The wider and thicker ore body, as well as higher throughputs required a dozer trap style unit rather than the receiving hopper for Atlas. It is anticipated that the unit will be fed by two D10 dozers and relocate across and along the mine path. Optimising push distances of the dozers, around three relocations per month are required.

16 Market Studies

The principal commodities titanium and zircon are freely traded, at prices and terms that are widely known, so that prospects for sale of any mineral production are virtually assured.

Tronox is the world's second largest producer of TiO2 based pigments and has the specific strategy of being predominantly vertically integrated. This means that its own mining production will provide the bulk of the titanium feedstock to its 9 pigment plants, located around the globe. Tronox Management Pty Ltd now markets all mineral products sold emanating from the Murray Basin mines. However, with the integrated pigment strategy, this predominantly relates to the range of zircon products and a relatively small amount of lower grade ilmenite.

Tronox routinely uses the services of various industry trade consultants to closely monitor and report on global production of titanium minerals and zircon as well as reporting on the current global supply and demand status, plus projections of new projects to come on stream, both timing and capacity. Export and import data by country is monitored. As noted earlier, zircon, TiO2 feedstock and TiO2 product pricing are internationally traded, specialized commodities. Generally, speaking, the prices of our products are substantially in line with the prices for each of these products published quarterly by TZ Minerals International Pty Ltd (TZMI) and other independent consulting companies who track the mineral sands, titanium dioxide and coatings industries.

The BHI ilmenite is of chloride grade and has a micro-porosity/reactivity that makes it suited to the Becher Synthetic Rutile process or direct chlorination. The lower TiO2 BHT ilmenite can be used for either smelting or as a blend for sulphate pigment processing. Natural Rutile is the highest-grade feedstock for chloride pigment plants and is consumed internally by Tronox. The leucoxene product made at Broken Hill will have a TiO2 content of just under 70% and will be consumed internally at Tronox pigment plants.

Zircon from Atlas-Campaspe contains higher Fe2O3 levels than that typically seen in zircon from the Eastern Operations. Current zircon pricing is based on a maximum Fe2O3 level of 0.08%, however the Zircon from the Atlas and Campaspe deposits have average Fe2O3 grades of 0.10% and 0.12%, respectively and when appropriate prices used in modelling are discounted to reflect elevated iron levels.

17 Environmental studies, permitting and plans, negotiations, or agreements with local individuals or groups

The status of all required Federal Government, State government and local shire council approvals, licences or permits are detailed in Table 5.

Table 5: Atlas and Campaspe - Status of Approvals, Licences and Permits

Domain	Required Approval	Status
Atlas Mine	Mining Lease ML 1767 under the *Mining Act 1992*.	Granted February 2018.
Campaspe Mine	Conversion of part of Willandra East Exploration Lease into a Mining Lease under the *Mining Act 1992*.	Not required until 2023.
Atlas-Campaspe Project	Development Consent under the *Environmental Planning and Assessment Act 1979*.	Granted June 2014.
	The Development Consent includes the following approved documents: • Construction Transport Management Plan. • Biodiversity Management Plan. • Noise Management Plan. • Air Quality Management Plan. • Water Management Plan. • Heritage Management Plan. • Environmental Management Strategy.	All supporting documents approved.
	The Development Consent requires the following outstanding management plans: • Radiation Waste Management Plan: The existing Radiation Waste Management Plan requires revision to include AtlasCampaspe product prior to commencement of mining. • Rehabilitation Management Plan: Requires approval prior to commencement of mining. • Operations Transport Management Plan: Requires approval prior to commencement of operations.	Currently being compiled.
Atlas-Campaspe Project	Project approval under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.	Granted September 2014.
Atlas Gravel Pits	Three Extractive Industry Licences under the *Crown Land Management Act 2016*.	Granted October 2018.
Ivanhoe Rail Facility	Crown Land Licence under the *Crown Land Management Act 2016*.	Granted May 2017.
Ivanhoe Rail Facility	Agreement with the Australian Rail Track Corporation (ARTC) for parts of siding on ARTC land to accommodate rail switches.	Design has been approved by ARTC. Final design approval in progress.
Atlas-Campaspe Project	Groundwater allocation licence totalling 14,000ML for AtlasCampaspe under the *Water Management Act 2000*.	Granted February 2013.

There are also two minor agreements in place for road diversions between the mine and Ivanhoe to facilitate the road train movement of HMC.

Mine Closure

Provision for mine closure, both scheduled and unscheduled will be made once mining commences. Progressive rehabilitation of disturbed areas will be conducted where applicable, and at the completion of mining all remaining disturbed grounds will be rehabilitated.

Rehabilitation consists of covering all slurried material, such as tailings, with dry overburden and subsequently capped with subsoil and topsoil sourced from subsoil and topsoil stockpiles which have been established during construction. Rehabilitation requirements are extensively outlined in the Environmental Impact Statement and associated management plans stipulated in the Development Consent.

18 Capital and Operating Cost

Capital cost for the Atlas Campaspe project is estimated to be between US$142 and US$174 million.

Operating costs used in the economic analysis comes from Tronox internal cost accounting systems.

19 Economic Analysis

The economic outcomes for the Atlas-Campaspe Project have been calculated on a 'minerals only' basis, whereby the minerals are valued as final products with no upgrading into either slag, SR or pigment. The minerals have been valued at purchase price, representing what Tronox could expect to pay to purchase equivalent quality feedstocks for either the slag furnaces, SR kiln or the pigment plants.

For the financial modelling that supports the current reserves, a range of mining block schedules are prepared by the senior mine development engineer. These schedules contain information on ore tonnes and grades, mineral assemblages, clay fines levels as well as other information that may impact on throughputs, recoveries and costs. Grouped cost drivers, physical and revenue parameters used in the modelling.

There are many mineral sands mines operating worldwide. Many as standalone mineral sales operations producing mineral products similar to those of Atlas Campaspe. With so many operations selling titanium and zircon mineral products on the open market Tronox chooses to value its ore reserves on the basis of what it would have to pay to buy the mineral products, if it didn't produce and use them itself. Mineral pricing data is readily available through a number of industry sources and from Tronox own marketing team.

The Atlas Campaspe orebodies are expected to be depleted by 2033 at which time other resources may well be mined utilizing the same equipment.

Key cost assumptions, macro and mineral price assumptions:

To determine the economic viability and cash flows of the Atlas Campaspe project, the Company utilized management's best estimates of the following key assumptions for the mining operations: 1) overburden removal cost, 2) mining plant variable cost, 3) concentrator fixed and variable costs, 4) tailings fixed and variable costs, and 5) maintenance, overhead and support services costs; and for the separation plant, the assumptions are as follows: 1) plant variable costs, 2) MSP fixed costs for Broken Hill and North Shore, 3) HMC haulage rates, Shipping rates to North Shore and 4) maintenance, overhead and support services. Other key assumptions were mineral royalties, distribution costs, mine and concentrator and MSP capital spending, tax rates, and exchange rates. Cash flows are positive for all years in the Life of Mine Plan out to 2033.

The physical mining and processing parameters used in the life of mine plan and applicable to exploiting the reserves result in an 11 year mine life with product yields from in ground mineral to saleable products as follows-

- Ilmenite 93%
- Rutile 89%
- Leucoxene 109%
- Zircon 75%

Sensitivity analyses have been conducted using variants such as commodity price, operating costs, capital costs, ore grade and exchange rates. As a result of these analyses, the project was determined to be economical viable in all scenarios.

20 Adjacent Properties

Not applicable.

21 Other Relevant Data and Information

Glossary of Terms summarised in Table 6.

Table 6: Glossary of Terms

Term	Definition
AFE	Application for Expenditure.
AHD	Australian Height Datum. The datum to which all vertical control for mapping and geodetic surveys is to be referred. Defined in National Mapping Council Special Publication 10 (NMC SP10).
AMDAD	Australian Mine Design and Development (Company).
ANCOLD	Australian National Committee on Large Dams.
ARTC	Australian Rail Track Corporation. A Statutory corporation, owned by the Government of Australia, which manages rail infrastructure.
bcm	bank cubic metres.
BoD	Basis of Design.
BOO	Build, Own, Operate (Contract).
CASA	Civil Aviation Safety Authority.
CMA	Cristal Mining Australia.
DB	Distribution Board.
DFS	Definitive Feasibility Study.
DMU	Dry Mining Unit.
DSC	(New South Wales) Dam Safety Committee.
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortisation.
EIS	Environmental Impact Study.
FPC	Feed Preparation Circuit.
GDA94	Geocentric Datum of Australia (1994). Geodetic datum covering the Australian continent. The GDA is defined by the coordinates of the Australian Fiducial Network (AFN) geodetic stations, referred to the GRS80 ellipsoid, determined within the International Earth Rotation Service Terrestrial Reference Frame 1992 (ITRF92) at the epoch of 1994.
GPS	Global Positioning System.
Ha	hectare (10,000m²).
HAL	Hot Acid Leach.
HAZOP	Hazard and Operability Study.
HM	Heavy Mineral.
HMC	Heavy Mineral Concentrate.
HV	High Voltage.
IFC	Issued for Construction.
JORC	Joint Ore Reserves Committee.
JORC Code	Australasian Code for Reporting of Exploration Results, Mineral Results and Ore Reserves.
kt	thousand tonne.
kt/y	thousand tonne per year.
LAN	Local Area Network.
LG	Local Grid.
LIDAR	Light Detection and Ranging. Surveying system which measures the distance to a target by means of laser light.
LTR	Low Temperature Roasting.
LV	Low Voltage.
MCC	Motor Control Centre.
MLA	Mine Lease Application.
Mt	million tonne.
Mt/y	million tonne per year.

Term	Definition
NMC	Non-Magnetic Concentrate.
NPI	Non-Process Infrastructure.
NPV	Net Present Value.
NSW	New South Wales (State).
OPTD	Off-Path Tailings Dam.
OST	On-Stream Time.
P&ID	Piping and Instrumentation Diagram.
PCN	Project Change Notice.
PCP	Pre-Concentrator Plant.
PFD	Process Flow Diagram.
PFS	Preliminary Feasibility Study.
PLC	Programmable Logic Controller.
PMP	Project Management Plan.
POP	Procurement Operating Plan.
ppm	parts per million.
ProCom	(Tronox) Procurement Committee.
Product yield	Ratio of mineral product against the grade and ore tonnes to produce
RFDS	Royal Flying Doctor Service.
RMS	Roads and Maritime Services. An agency of the Government of New South Wales.
RO	Reverse Osmosis (Plant).
ROM	Run-of-Mine.
SR	Synthetic Rutile.
SteerCom	(Tronox) Steering Committee.
t	Metric tonne (1,000kg).
t/y	tonne per year.
TIC	Total Installed Cost.
VSD	Variable Speed Drive.
WCP	Wet Concentrator Plant.
WHIMS	Wet High-Intensity Magnetic Separator.
XRF	X-Ray Fluorescence.

22 Interpretation and Conclusions

The declaration that the Atlas and Campaspe Projects have 107Mt of ore reserve at 6.3% HM grade and resources of 114Mt at 3.0% HM grade is well supported.

The mineralisation is well understood and is continuous over many kilometres. The basement material is well defined by a sharp drop off in HM grade and the overburden sands are often mineralized but well below cut-off grade. Parameters such as the drill hole spacing, the metre-by-metre downhole analysis, the attention paid to domain composites, the accuracy of analytical checks as well as the known performance characteristics of the existing plant and equipment utilized for this project all provide solid support for there being a low margin for error.

The product qualities are varied with the high TiO2 ilmenite being suited for synthetic rutile production or smelting, the rutile and leucoxene suited to direct use chloride pigment processes that Tronox predominantly operates and the zircon easily sold into existing markets.

Tronox Mining Australia has a good record for rehabilitation of past mining areas, groundwater management, control of dust and radiation management. Relationships with key stakeholders and government regulators are also in good standing. The LOMP expects to operate through to 2033 with mine closure and rehabilitation plans and provisions made.

On a minerals only basis, financial modelling shows that future reserves are profitably mineable.

The Atlas and Campaspe operations will form a key part of the Tronox vertically integrated pigment production process.

23 Recommendations

That geological work continues to better define the economic margins of the resources, looking for inclusion, at least in part, as reserves to further extend mine life.

24 References

A list of References is summarised in Table 7.

Table 7: List of References

Title
Tronox Eastern Operations - Resources and Reserves Annual Report 2021
Atlas Campaspe Project, Definitive Feasibility Study Report, October 2019

25 Reliance on information provided by the registrant

The preparation of this Technical Summary Report relies on information provided by Tronox and its employees in the following areas, as they are reasonably outside the expertise of the qualified persons.

- Marketing plans and pricing forecasts as key inputs to the economic modelling
- Environmental performance commitments and mine closure costing
- Maintenance of licenses and other government approvals required to sustain the LOMP
- Capital to progress the mining of the Atlas and Campaspe deposits

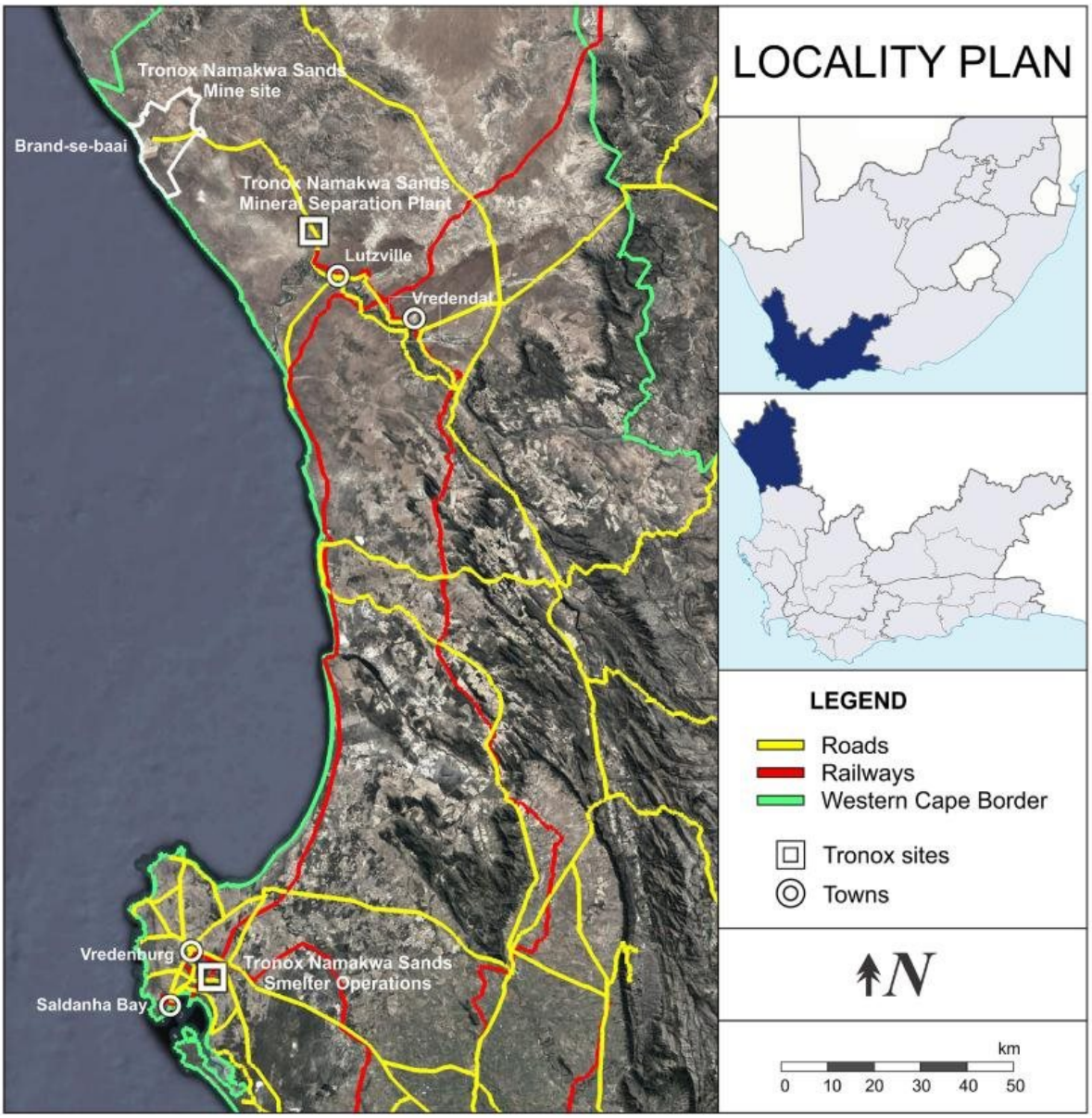
26 Date and Signature Page

This report titled "Atlas-Campaspe Technical Report Summary" with an effective date of December 31, 2021 was prepared and signed by:

/s/ Paul Stevenson

Paul Stevenson, Manager Minerals Resource Development
Dated at Muchea, Western Australia
February 22, 2022

Figure 1: Location of Western Cape operations



Production comes from two shallow open pit mines where excavators and front-end loaders extract free running and lightly consolidated/cemented sand. The ore is conveyed to two primary concentrator plants (PCP) that utilize wet spirals to produce a heavy mineral concentrate. These concentrates are pumped to a secondary concentrator plant (SCP) where wet high-intensity magnetic separators (WHIMS) and spirals are used to produce a zircon-rich non-magnetic concentrate, and a magnetic concentrate comprising mainly ilmenite. An ilmenite rich secondary stream from the SCP is reprocessed at a separate plant called the UMM Plant to produce a crude ilmenite. SCP and UMM concentrates are separately trucked to and treated at the mineral separation plant (MSP) near Koekenaap, where a series of magnetic and electrical high-tension separators are employed to produce ilmenite, rutile, and zircon products. These products are transported from the Mineral Separation Plant to the Smelter using the Saldanha-Sishen railway network.

The Southern Operations consist of the administrative headquarters and smelter operations and are located 3 km from the Saldanha export harbour. The smelting process comprises the carbonaceous reduction of ilmenite using DC arc furnaces to produce titanium slag and pig iron. The received rutile and zircon products as well as the titanium slag are stored in on-site silos from where it is distributed in bag, container, or bulk shipment format.

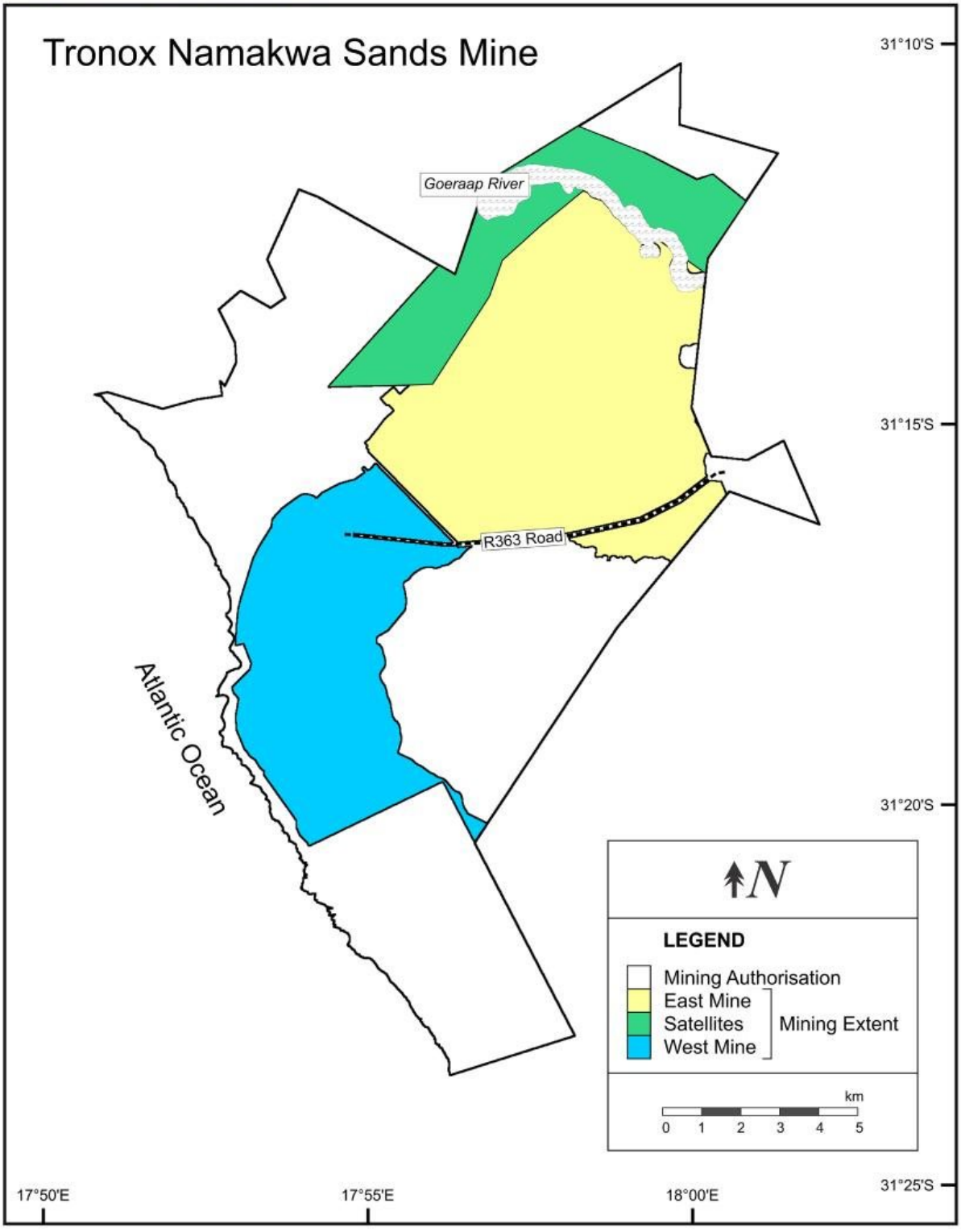
Mining tenements in South Africa are managed at a national level. In the Western Cape, Mining Rights and Prospecting Rights are granted and administered by the South African Department of Mineral Resources and Energy.

The Mining Rights for Namakwa are shown in Table 1 and Figure 2.

Table 1: Tronox Mining Rights, west coast of South Africa

Area/Farm	DMRE Ref. no.	Area (ha)	Current status
Goeraap 140 Portion 17	WC 30/5/1/2/2/114 MR	250	active, expires 17 August 2038
Graauwduinen 152 Portion 1	WC 30/5/1/2/2/114 MR	2,978	active, expires 17 August 2038
Hartebeeste Kom 156 Portion 1 & 2	WC 30/5/1/2/2/114 MR	3,903	active, expires 17 August 2038
Rietfontein Ext 151 Portion 1 & 2	WC 30/5/1/2/2/114 MR	2,084	active, expires 17 August 2038
Hartebeeste Kom 156 Portion 3	WC 30/5/1/2/2/113 MR	1,790	active, expires 17 August 2038
Houtkraal 143 Portion 3	WC 30/5/1/2/2/113 MR	1,780	active, expires 17 August 2038
Graauwduinen 152 Portion 2	WC 30/5/1/2/2/10040 MR	599	active, expires 29 March 2046
Graauwduinen 152 Remaining Extent	WC 30/5/1/2/2/10040 MR	1,776	active, expires 29 March 2046
Rietfontein Ext 151 Remaining Extent	WC 30/5/1/2/2/10040 MR	2,536	active, expires 29 March 2046
Houtkraal 143 Remainder of Portion 2	WC 30/5/1/2/2/10040 MR	645	active, expires 29 March 2046
Houtkraal 143 Remaining Extent	WC 30/5/1/2/2/10040 MR	864	active, expires 29 March 2046

Figure 2: Namakwa Sands tenement plans



The total area covered by the Mining Rights is 19,205 hectares as shown in Figure 2 above.

The minerals in South Africa belong to the Government and Tronox is obligated to pay a royalty to the South African Revenue Services (SARS) based on the sales of final mineral products. The actual royalty payable depends on the EBIT (Earnings before Interest and Tax) adjusted for capex redeemed, generated through the "sales" of mineral products. The royalty percentage ranges between a minimum of 0.5% to a maximum of 7%.

Tronox owns all the properties for which it holds Mining Rights.

4 Accessibility

The project area is characterised by low-lying weathered sandplains situated in the arid succulent Karoo biome, on the South African West Coast. The region's climate is characterised by low winter rainfall, 150mm annual average, high summer temperatures, maxima exceeding 40°C and high-water evaporation rates. Wind speeds are periodically sufficient to mobilize fine sands.

The Brand-se-Baai site, the MSP and the Saldanha operations are connected by the bituminized roads R362, R363 and R364. The N7 national highway runs from Cape Town to north of Brand-se-Baai approximately parallel to the coastal roads mentioned but slightly further inland (Figure 1).

Land that is not mined, and which falls outside of any active mining areas, is leased back to the neighbouring farmers for on-going use as grazing for small stock. The northern boundary of the mine abuts onto a well-established salt works located on the Sout River estuary. The farm to the east of the mine also runs a guesthouse.

Employees live in local towns of Koekenaap, Lutzville, Vredendal but spread as far as Klawer, Vanrhynsdorp and surrounding areas. The company runs buses and vans for employees from all local towns to Koekenaap and Brand-se-Baai each shift change.

Infrastructure availability is disclosed in section 15.

5 History

Exploration for heavy minerals along the coastal strip of southwest Africa led to the discovery and subsequent delineation of the Namakwa Sands deposit near Brand-se-Baai in 1987.

In September 1994 Anglo Operations Ltd commenced mining and processing at the West mine ore body.

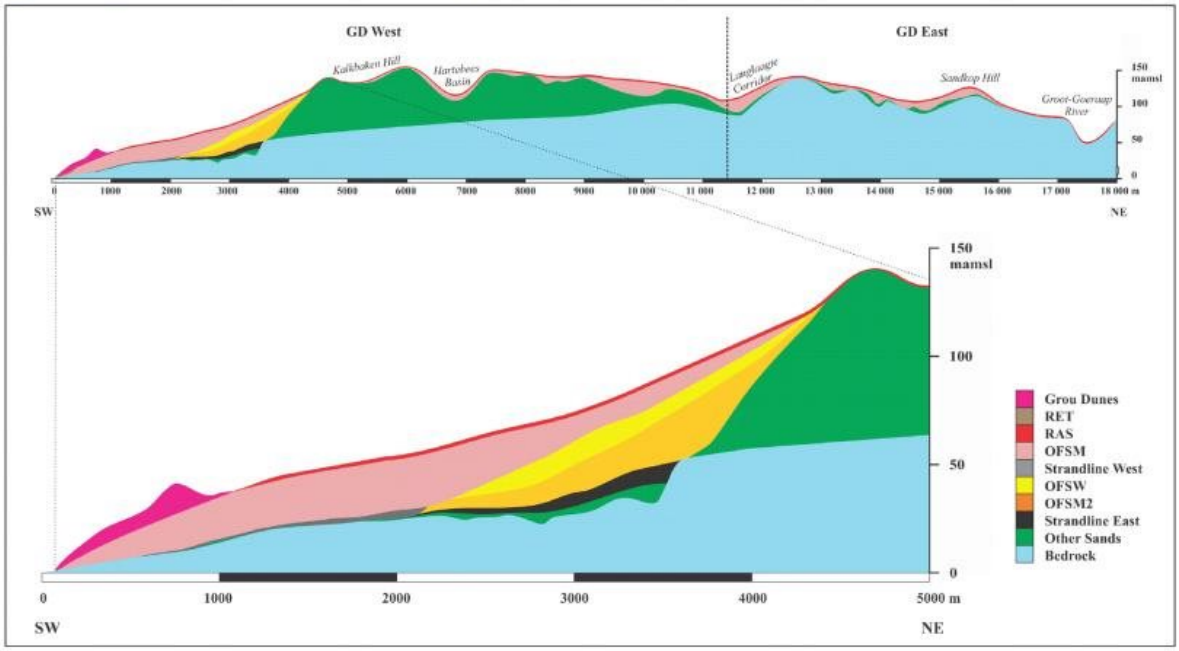
In 2008 Exxaro Resources acquired the Namakwa operations from Anglo and then in 2012 Tronox acquired 74% of Namakwa Mineral Sands Pty Ltd. In 2021 Tronox acquired the whole of Namakwa Mineral Sands Pty Ltd.

6 Geological Setting, Mineralisation and Deposit

Heavy mineral sand placer deposits are surface mineral deposits formed by mechanical concentration of resistant heavy minerals derived from weathered material. The formation of heavy mineral sand deposits requires the interaction between a provenance (source), transporting systems (marine, fluvial and/or terrestrial) and a depositional environment, within which certain concentration processes prevail.

The Namakwa Sands deposit consists of two adjacent orebodies, referred to as the Graauwduinen West orebody and the Graauwduinen East orebody, which are named after the farm Graauw Duinen, the discovery site. A SE-NW trending depression called Langlaagte Corridor defines the border between the two orebodies (Figure 3).

Figure 3: Typical Cross Section for Namakwa deposits.



The Graauwduinen West orebody

The Graauwduinen West orebody comprises a barren paleodune complex that is overlain by a series of elevated strandline deposits, which in turn have been largely reworked into a dune sequence superimposed with duricrust. Free-flowing cover sands terminate this stratigraphy.

Basement in the area comprises mostly the mid-Neoproterozoic Gariep Supergroup metasediments, with lesser contributions from the Mesoproterozoic Namaqualand Metamorphic Province rocks (Figure 4).

A collection of barren, unconsolidated, well sorted, fine-grained aeolian sands called the Other Sands cover the bedrock predominantly.

The eastward-thickening, shallow-marine succession of Strandline East represents the first major stage of local marine sedimentation. This raised, fossilized strandline deposit lies approximately 2 km inland from the current coastline and displays typical log spiral morphology.

In a northerly direction Strandline East is about 5.5 km long, up to 1 km wide, and 5 m thick on average. Eastward it pinches out around 50 m amsl. Northward the Other Sand underlie Strandline East, but to the south downward to 20 m amsl, it covers bedrock directly. Highly mineralized, moderately sorted, medium-grained, dark-brown, olive-green, and black sands occupy the top part of Strandline East. Most parts of Strandline East appear to be reworked and redistributed into the above-lying Orange Feldspathic Sands Mineralized 2.

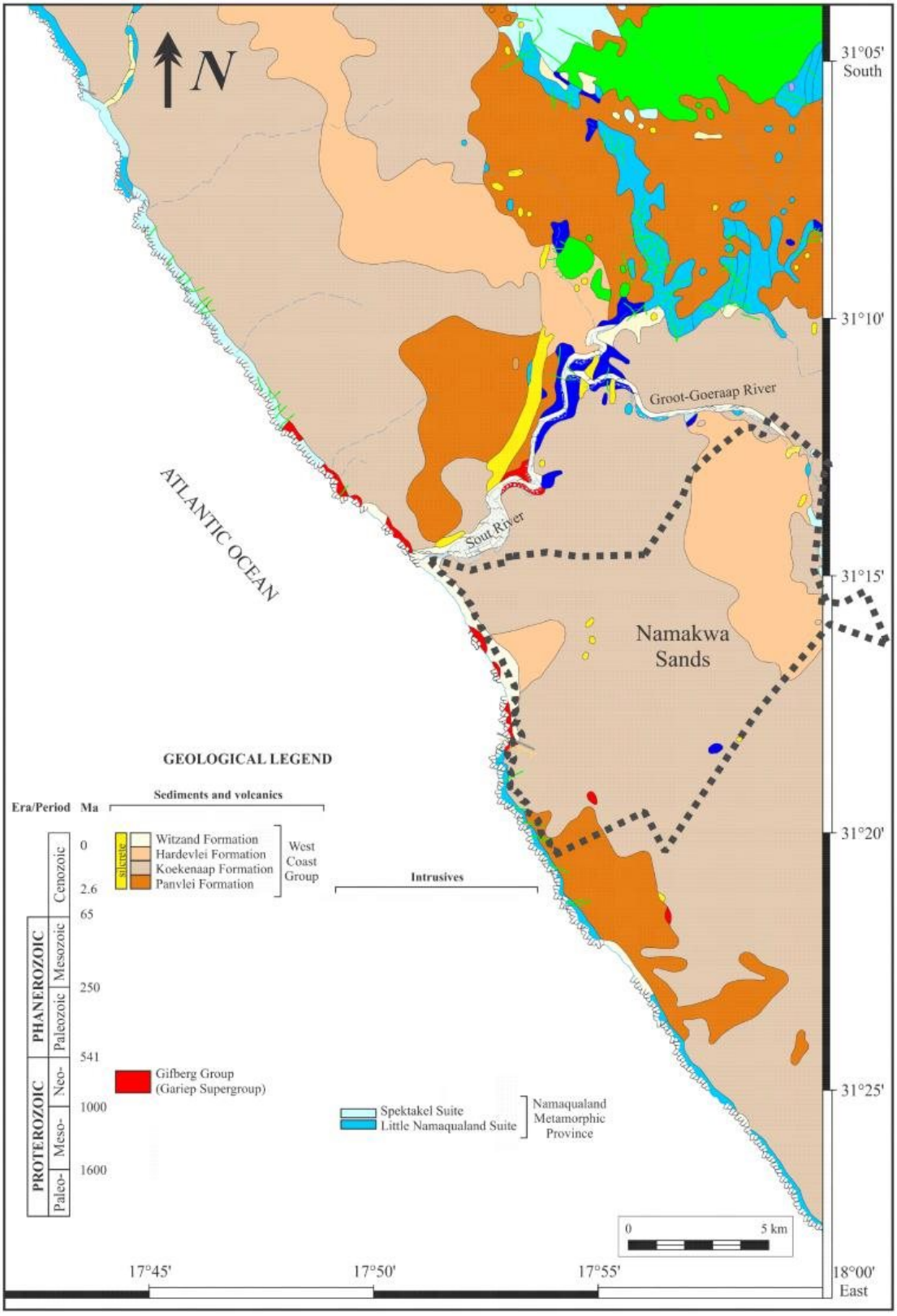
The basal unit of the Orange Feldspathic Sands Waste (OFSW) comprises a 1m to 2m-thick, fairly developed duricrust horizon. Thin, localized mud pans and sandy colluvial lithologies are often interfingered. The following lithology consists of an unconsolidated, distinctly dark-yellow, moderately sorted, medium-grained sand. The aeolian fossil contents peak in this unit, resulting in an anomalous phosphorous signature particular to the 75- to 90-m amsl level and surrounds.

Strandline West characterizes the next major marine transgression to a maximum elevation of 30 m amsl. This strandline deposit exhibits similar features to Strandline East but is about half the size.

The third mineralized dune succession called Orange Feldspathic Sands Mineralized (OFSM) hosts the bulk of the ore of the Namakwa Sands deposit (Figure 3). Its four lithologies form a relatively massive, seaward-thickening wedge, which can be up to 30 m thick. The basal portion constitutes a yellow, well developed duricrust horizon, referred to as the Hards, which cemented an assortment of terrestrial fossil types. In the western part of the Graauwduinen West orebody the Hards overlie reworked Strandline West, but toward the east it rests on the top of the Orange Feldspathic Sands Waste. Compared to the Subhards, the Hards are also predominantly calcareous but have a higher clay content.

The fourth mineralized dune succession, which is distinctly rubified, includes a complex duricrust horizon called Dorbank, which is overlain by free-flowing Red Aeolian Sands. The characteristic red coloration of both these units relates to prolonged oxidation of ferruginous minerals in a hot and arid climate that has marked the area since the Quaternary. The Dorbank occupies the top part of the Orange Feldspathic Sands Mineralized and is mapped across the entire Graauwduinen West orebody. The vertical thickness of cementation is inconsistent, ranging up to 15 m, and laterally it can be extremely discontinuous. On a larger scale, the Dorbank manifests thickest in topographic depressions, thinning to the northeast and southwest flanks, approximating basin-like morphology.

Figure 4: Local Geology of the Namakwa Sands area



Intensely reddened, fine-grained, moderately sorted, up to 5 m thick, free-flowing sands of the Red Aeolian Sands (RAS) cover the Dorbank unconformably. These aeolian sands are generally structureless with abundant fauna and flora taxa relics (Figure 3).

The Graauwduinen East orebody

The Graauwduinen East orebody represents surficial aeolian sands, overlying a clayeous dune sequence, cast on top of barren sands. Intercalations between mid-Neoproterozoic Gariep Supergroup and Mesoproterozoic Namaqualand Metamorphic Province basement lithologies become more common here (Figure 4). Unlike the generally flat and scoured bedrock profile encountered in the Graauwduinen West orebody, the bedrock in the Graauwduinen East orebody displays extreme undulation and outcrops frequently, noticeably to the southeast.

The bulk of the ore in the Graauwduinen East orebody is represented by the above-lying Orange Feldspathic Sands Mineralized, but the two constituting lithologies are much thinner than found in the Graauwduinen West orebody (Figure 3). The average thickness is about 5 m, but in the eastern part of the Graauwduinen East orebody the Orange Feldspathic Sands Mineralized can be up to 20 m thick.

In the Graauwduinen East orebody, the base of the Orange Feldspathic Sands Mineralized is cast as a laterally continuous, single layer duricrust horizon, called Hardpan that can reach up to 5 m in thickness. Its streaky, orange-white, rust-like appearance is very different to the Subhards or Hards found in the Graauwduinen West orebody. Instead, it resembles the type of duricrust that underlies much of the Namaqualand coastal plain. The physical competency of the Hardpan is also considerably weaker than the duricrust mapped in the Graauwduinen West orebody and it appears compacted rather than lithified. This is possibly because the cementing agent is a noncalcareous, ferrialuminous clay.

The Red Aeolian Sands are also substantially thicker, and it constitutes light-orange, well-sorted, medium-grained, unconsolidated, but well-articulated sands. these particular Red Aeolian Sands are considered incongruous to the Red Aeolian Sands in the Graauwduinen West orebody (Figure 3).

Mineralogical Classification

Heavy mineral assemblages representing the two orebodies are distinctly different. The Graauwduinen West orebody lithologies are characterized by heavy mineral assemblages that contain high quantities of garnet and pyroxene, and conversely lesser quantities of ilmenite and zircon. By contrast, heavy mineral assemblages of the Graauwduinen East orebody lithologies are appreciably enriched in ilmenite and zircon and host smaller proportions of the other key heavy minerals, particularly pyroxene.

On average the Graauwduinen West orebody contains 34% ilmenite, 8% zircon, 8% leucoxene, 3% rutile, 16% garnet, 17% pyroxene, and 14% other heavy minerals in the THM. Heavy mineral assemblages of the Graauwduinen East orebody typically contain 60% ilmenite, 13% zircon, 7% leucoxene, 4% rutile, 6% garnet, 1% pyroxene, and 9% other heavy minerals in THM.

The proportion of valuable minerals in the total heavy mineral suite increases upward in the Graauwduinen West orebody stratigraphy, from 34% in Strandline East to 78% in the Red Aeolian Sands. The Graauwduinen East orebody, by comparison, features appreciably better and more consistent valuable heavy mineral proportion of typically around 85%. Ilmenite dominates all the valuable heavy mineral fractions without exception, followed by zircon, leucoxene, and rutile in that order of abundance; however, their proportions also differ for the two orebodies. Upward in both orebodies, the proportion of zircon increases at the expense of ilmenite, whereas the rutile abundance remains relatively uniform.

The various geological units differ strikingly in VHM content. East Mine RAS has a high VHM content, which explains its superior processing character in comparison to the lesser-pronounced West Mine RAS. The bulk of the mineralisation (OFSM) typically comprises only 50% VHM due to the presence of nearly equal amounts of garnet and pyriboles.

The OFSM2 represents the poorest section of the economic horizon with low VHM values characterising the grade-enriched strandline deposits, whereas the uneconomic units (OFSW and Other Sands) contain garnet, pyroxene and other heavy minerals in appreciable amounts at the expense of the valuable minerals. Mineral components such as apatite, kyanite, monazite, chromite and cassiterite generally occur in trace amounts (<0.2% in total) and their distribution is grade related.

Of interest recently is the potential use of monazite, both in contained ore bodies and in stockpiled sources located near the Mineral Separation processes at Namakwa. Monazite has increasing commercial value due to a high concentration of rare earth metals which can be separated by well-established methods. Rare earths are expected to remain in high demand as demand grows for electric vehicles, wind turbines, and consumer goods that require rare earth-containing permanent magnets. We currently do not know the metallurgical recovery potential for the monazite as our processes have historically focused on traditional valuable minerals. Given the increasing importance of monazite, we are evaluating new processes to better understand the grade and recoverability of monazite in our mining tenements.

Mineral coatings, defined as non-discrete mineral matter, is prevalent on all minerals. They are extremely variable for all geological units, but on average the OFSM and OFSM2 are more coated than the RAS. A reddish clay-like substance almost exclusively coats the RAS minerals whereas yellowish-white silicate coatings, most likely related to the dorbank event are more characteristic of the OFSM.

In summary, the Namakwa Sands Deposit is an elongated ore body confined between two topographic highs and strikes from the Atlantic Coast inland for approximately 14 km into a north-eastern direction (Figure 2, Figure 3).

Along its widest part the ore body extends over approximately 4 km. The mineralisation extends from within the sea, but for environmental reasons a setback of 300m from the high-water mark along the beach, has been established. In the western ore body, the mining depth is defined by lithological and/or mineralization parameters. It varies in depth from about 20m in the west, as defined by the bedrock contact, to about 50m in the east where the boundary is defined by barren or poorly mineralised other sand. However, the final mining depths are determined during production scheduling, by the economic mineable material. The eastern ore body consists of a thin veneer of aeolian surface sand, and an underlying deeper resource in the northern parts. The ore body

extends over 17,000 hectares, with some possibility of extension. The mineralisation stretches from surface down to basement/other sand and no overburden stripping is required.

7 Exploration

Currently all drilling is confined to the Mining Right area. There is no greenfields exploration work to disclose.

8 Sample Preparation, Analyses and Security

Drilling

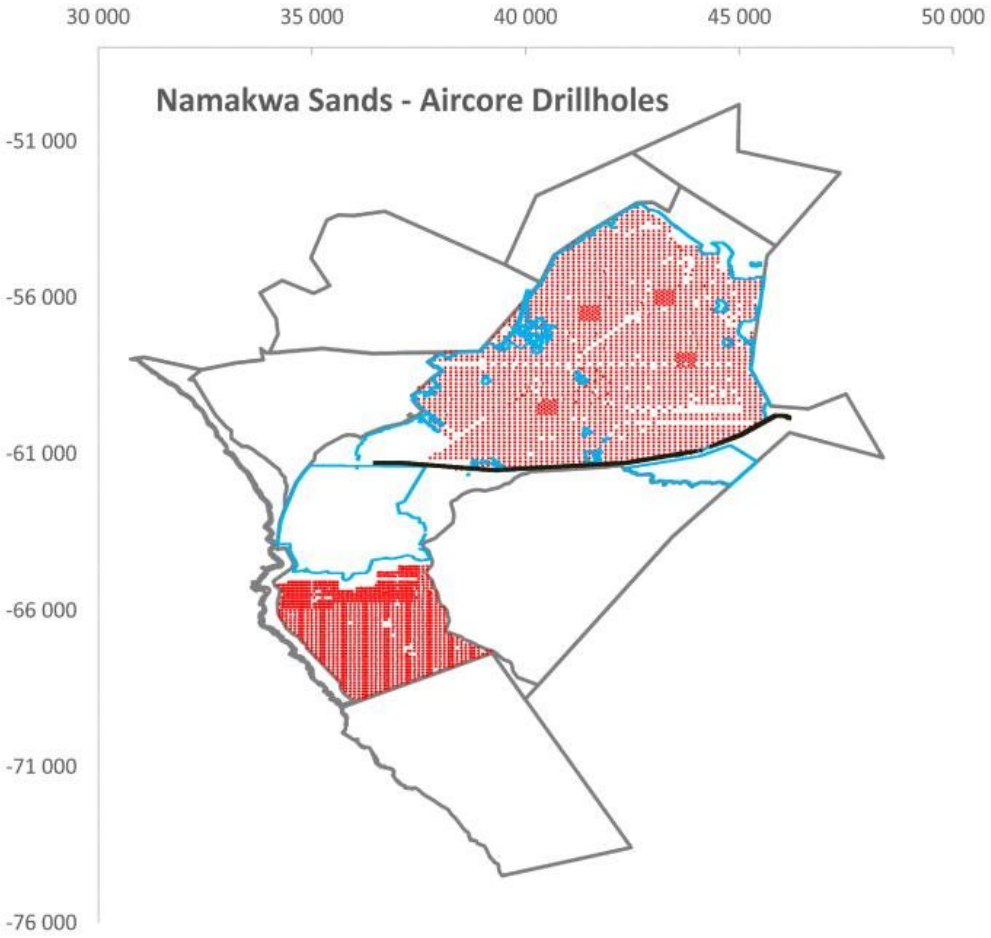
Reverse circulation "aircore" drilling is mainly used, other than for the shallow free-flowing mineralised sands, (RAS) where auger sampling methods are employed.

Aircore drilling is completed using a small Landcruiser mounted drill. This style of drilling suits the soft sand ground conditions, and the drilling is relatively shallow (5-40m) and very rapid.

Holes are drilled vertically using three metre NQ size rods, giving a nominal hole diameter at the bit of 83 mm. Drill samples are collected in one metre continuous intervals from surface. The drill sample return is captured through a cyclone to separate the air and reduce sand velocity which is then captured in plastic sample bags and riffle split to approximately 3 to 5 kg each at the drill site. All samples are sent to the Tronox's internal lab for clay fines and heavy mineral analysis.

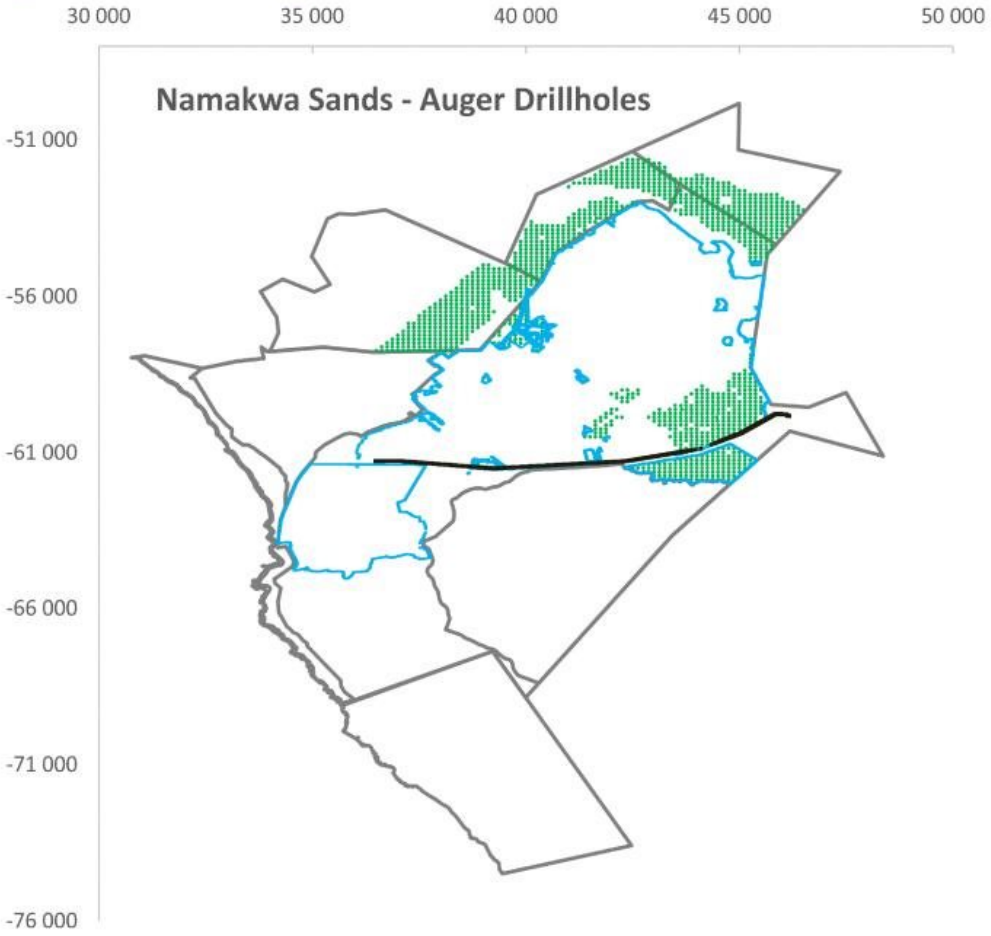
Figure 5 and Figure 6 show the auger and aircore drilling density over the mining authorization that is not mined out.

Figure 5: Namakwa Sands Aircore Drillholes



At the laboratory, approximately 300g drawn from the 8-pot rotary splitter is dry screened at 1mm to remove oversize material.

Figure 6: Namakwa Sands Auger Drillholes



Clay fines, Oversize and Total Heavy Mineral Analyses

At the laboratory, approximately 300g drawn from the 8-pot rotary splitter is dry screened at 1mm to remove oversize material. Another 300g sample is taken and submitted for XRF analyses. A reference sample is also kept and is stored on site. The clay fines are removed by wet screening at 45microns and the intermediate of these two operations is subjected to SG 2.85gcm-3 bromoform to capture the quantity of Heavy Mineral sinks. All masses are converted to percentages based on initial sample mass and the mass of the relevant sub fraction.

Fused disc XRF analysis of in situ material is used to determine the main oxide abundances, including TiO^2 and ZrO^2.

Assay data is returned from the laboratory in digital format and merged into a relational database.

Mineralogical Analyses

QEMSCAN, an adaptation of SEM technology, uses the relatively fast assay scan results to match with results obtained from known minerals in a standard suite of samples. The method is particularly useful for detecting titano-haematite and intergrowths of ilmenite and haematite.

Since inception of the mine in 1994, the distribution of the TiO^2 and ZrO^2 between the ilmenite, rutile, leucoxene and zircon has been estimated from the XRF data. Quantitative electron scanning microscopy (QEMSCAN), development work since 2006, has refined the conversion of the metal analysis into mineral species.

9 Data Verification

XRF standards

Practice at Namakwa Sands includes the submission a high- and low-grade matrix-matched Control Reference Material (CRM) from East RAS tailings spiked with known quantities of Namakwa Sands ilmenite and zircon concentrate. The spiked samples were submitted to various laboratories and the certified mean, upper and lower limits determined.

Two CRM's of known different grades (low and high) are submitted with the lab samples on an alternating basis to identify and quantify XRF lab accuracy, precision, and bias. CRM samples are submitted at the rate of one in every ten samples submitted to the labs in batches of fifty. A sequential numbering system is used, rather than separate identifiers for standards and replicates. This maintains sample anonymity within the laboratory.

Standard control charts are maintained during the course of the drilling program to highlight and address lab anomalies. A batch should be repeated if 2 values in the batch fall outside of 5%, or 2 standard deviations of the mean. A total 95% of the standards are required to fall within 5% of the mean for the exploration programme.

Blanks

The blind submission of blanks is required to identify contamination during the XRF lab sample preparation process. The total sample programme contains a minimum of 5% (1 in 20) blank submissions. Two blank numbered samples are added randomly in sample batches. Values are continually monitored on Blank Control Charts.

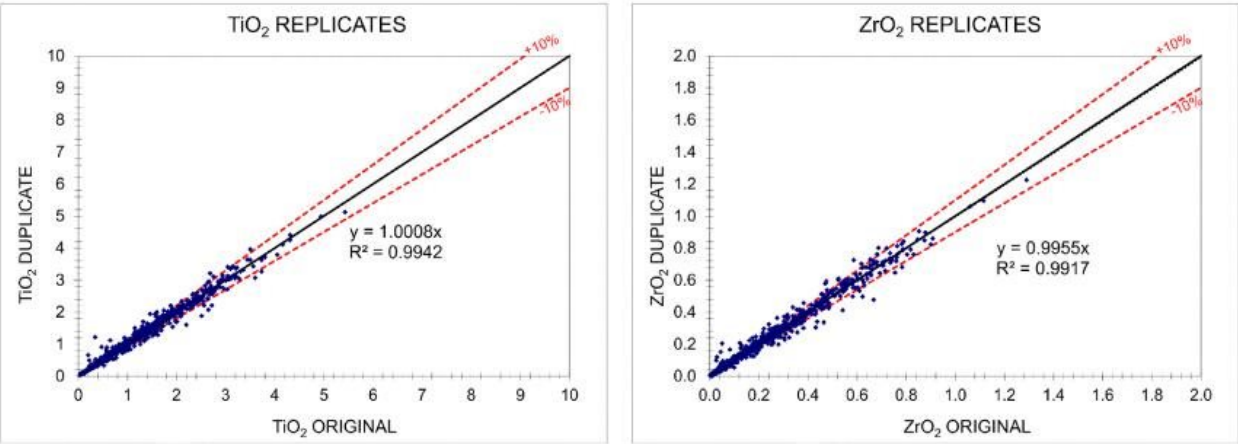
Replicates

At least 10% of the total sample programme contain identical coarse replicates obtained by the rotary splitting of selected samples. These are submitted (blindly) to the XRF lab to quantify analytical precision and to detect sample preparation errors. This is monitored by means of replicate control charts and any anomalies validated with the XRF laboratory.

Summary of Geochemical Quality Assurance and Quality Control

From the recent West Mine drilling campaign, of the 11,320 samples analysed at ALS, Johannesburg, only one duplicate representing one batch of 50 samples was repeated as it had plotted beyond the trigger limits ((Figure 7). This is 0.4% of the total samples under consideration.

Figure 7: Replicate control charts for TiO_2 and ZrO_2.



One batch of control sample low was queried and re-analysed. This represents 0.4% total samples analysed. Two batches of control sample high were queried and re-analysed. This represents 1% total samples analysed.

The analyses in total performed beyond 95% target confidence.

The Qualified Person considers the data validation confirms that the accuracy of the mineralisation assays is in line with industry standards and is suitable to support estimates of Resources and Reserves.

10 Mineral Processing and Metallurgical Testing

More than two decades of mining and processing mineral from the Namakwa field along with production forecast modelling techniques and extensive ore characterization work on zone composites provides substantial and suitable recovery prediction information. The methods used are industry standard.

Various studies have quantified the impacts on recovery of poor mineral liberation, anomalously high abundance of garnets and pyroxenes and variations in particle chemistry. The others content is the most significant constraint to ilmenite recovery, whereas zircon chemistry is the most important negative factor in the production of a premium quality zircon product. Results of studies have been used to refine the geometallurgical model and identify opportunities to optimise mineral resources utilisation. The geometallurgical model describes selected relationships between ore characteristics and mineral recoveries and is determined from bulk samples. These ore characteristics manifest as bulk properties, for example oversize contents (+1 mm particle size), fines contents (-45 µm particle size), mineral grade and heavy mineral composition.

11 Mineral Resource Estimates

Variography

Ordinary Kriging is used for all the estimation processes. Conversion to mineral species from chemical data was done in the block model after the data (ZrO_2 and TiO_2) were estimated by applying calculations in the block model. The geological resource model was constructed systematically by estimating the relevant grades into the regularised blocks. The various geological horizons were estimated using different methods as discussed below.

Prior to ordinary kriging, the appropriate geological horizons (RAS, OFSM, OFSM2, OFSW and two Strandlines) were extracted from the block model using rock type ("material") selection criteria. The extracted RAS and OFSM were constrained using boundary strings to select (separately), each of the different zones.

The geological block model (25m × 25m × 1m blocks) was used as the basis for the construction of the resource model. DTM's are used as constraints, and all blocks are also assigned a material type in the Surpac block model module.

The dorbank is reclassified from within the OFSM layer during the last stage of forming the geological block model based on CaO and MgO ratios.

The various geological units are classified into measured, indicated, and inferred resource categories based on:

- Drill density
- Drilling method and sampling interval
- Continuity of mineralisation and geological units
- Reliability of assay method and mineralogical information
- Frequency and results of QA/QC data

Confidence in Estimations

Experimental variograms were calculated separately for each variable of all the geological domains, the OFSM2, OFSW and the two strandlines. The Surpac software suite and the appropriate composited borehole data were used for this analysis.

The attributes that are modelled are THM, slimes, oversize, ZrO_2 and TiO_2 content. For OFSM, CaO and MgO estimations were also done.

Omni-directional variograms were constructed to determine the Kriging parameters for the estimation process.

Variography is completed for all domains to determine anisotropy and to set search ellipsoid parameters. Typical variogram ranges are greater than several hundred metres in any lateral direction. Consistently larger than the drill spacing used to define resources.

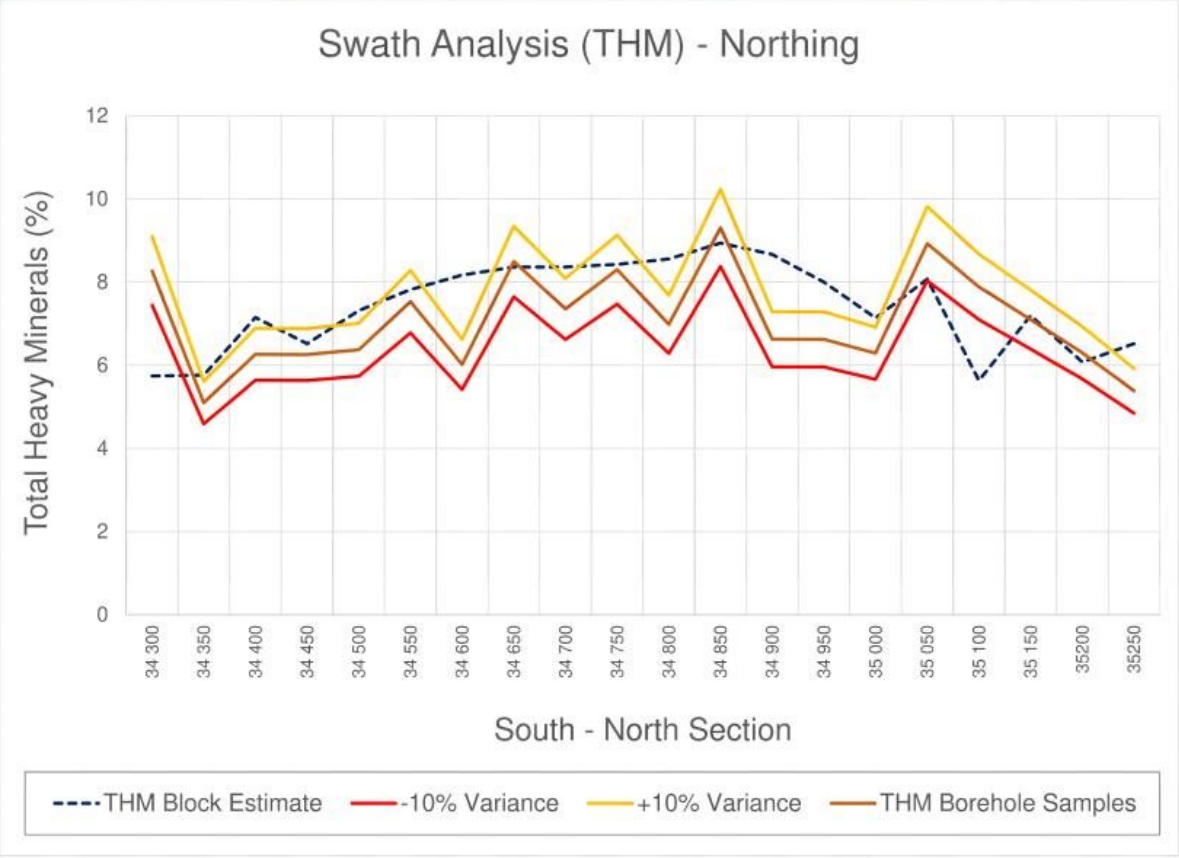
Block Model Construction

Block models are created in Geovia Surpac using a 25m × 25m × 1m block size with one standard level of sub-celling allowed.

Grade Estimation

The estimation of block grades is completed using the estimation codes and applied hard boundaries to all domains. Estimation is undertaken for heavy mineral, clay fines, oversize and mineral assemblage data. A comparison between the output Block Model THM grade estimate and the input borehole sample THM grades is shown in Figure 8 below.

Figure 8: Sectional comparison of block model grade estimates, borehole grades and resultant variances



Cut-off values

Currently resource volumes are established for cut-off grades of 0.3% zircon, which is in line with the breakeven grade.

Density

The relative in situ density has previously been determined using the standard box frame method and averaged 1.7t/m3. To compensate for heavy mineral content of the samples, THM is multiplied by 0.01 and added to the RD factor.

Later tests were performed by external specialists using the box frame method, on all the geological units, except for dorbank and strandlines. The density for all the units came to a value of 1.91 g/cm3. That value is used for all units, but the calculated unit for RAS, Dorbank and the strandlines is retained.

Mineral Resource Classification

The various geological units were classified into measured, indicated and inferred resource categories based on the confidence in the geological analyses, the geological complexity evident in the various stratigraphic units, and the borehole distribution and spacing.

Due to the poly metallic nature Tronox uses economic contribution as a guide to cut-off determination rather than just zircon grade. This also allows for the broad mineralization of surrounding areas. As costs change over time and long-term revenue values change, new reviews are conducted which may lead to a modified mining plan becoming optimal.

The 2021 Mineral Resources Statement for Namakwa Sands is presented in Table 2 on the next page.

Table 2: Namakwa Sands Summary of Mineral Resources at the End of the Fiscal Year Ended 2021

Exclusive Mineral Resources – Namakwa Sands 2021					
Mineral Resources Category	Material Tonnes Mt	THM Grade (%)	Mineral Assemblage		
			Ilmenite Grade (%)	Rutile + Leucoxene Grade (%)	Zircon Grade (%)
Measured	111	7.3	31.6	5.7	6.9
Indicated	86	6.5	28.3	5.6	6.9
Measured + Indicated	197	6.9	30.1	5.7	6.9
Inferred	110	5.5	35.1	8.1	6.5
TOTAL	**307**	**6.4**	**31.9**	**6.5**	**6.8**

(1) Cut-off grade applied is 0.3% zircon
(2) Mineral Resources are exclusive of Mineral Reserves

12 Mineral Reserve Estimates

Several Life of Mine (LOM) production schedules are produced and run through an economic model. Based on the results of the economic model an optimised schedule is produced.

The material scheduled previously classified as measured will be converted to proven reserves and material previously classified as indicated resources will be converted to probable reserves. If any liabilities e.g., legislative, environmental, etc. exists, proven resources will be downgraded to probable reserves.

Mineral Reserves are subsets of Resources, having used the same modelling processes but with a higher grade and financial outcome metric applied.

The 2021 Mineral Reserves Statement for Namakwa Sands is presented in Table 3 below.

Table 3: Namakwa Sands-Summary of Mineral Reserves at the End of the Fiscal Year Ended 2021

Mineral Reserves – Namakwa Sands 2021						
Mineral Resources Category	Material Tonnes Mt	THM Grade (%)	Mineral Assemblage			Change from 2020
			Ilmenite Grade (%)	Rutile + Leucoxene Grade (%)	Zircon Grade (%)	
Proven	148	7.8	37.0	8.6	9.0	2.7%
Probable	555	5.4	53.7	11.1	11.4	-4.8%
TOTAL	**703**	**5.9**	**49.0**	**10.4**	**10.7**	**-3.3%**

(1) Mineral prices used in Reserve estimation are substantially in line with the prices for each of our products published quarterly by independent consulting companies
(2) Metallurgical recoveries vary by mineral and are discussed in the Economic Analysis Summary

13 Mining Methods

Mining takes place in two distinct areas known as the East and West Mines. The East Mine comprises predominantly shallow mineral sands stripping. The West Mine entails shallow stripping of mineral sands followed by a deeper mining operation recovering hardened materials to a depth of about 40m. The shallow mining is done with front-end loaders onto a conveyor system (East Mine) or dump trucks (West Mine). The deeper mining is done with hydraulic excavators loading rigid dump trucks that convey the material to a central tipping area. Material is transported to the plant via a conveyor system from the tipping areas. Beneath the shallow sands of the East mine lies a future ore body called East OFS for which a definitive feasibility study is almost complete.

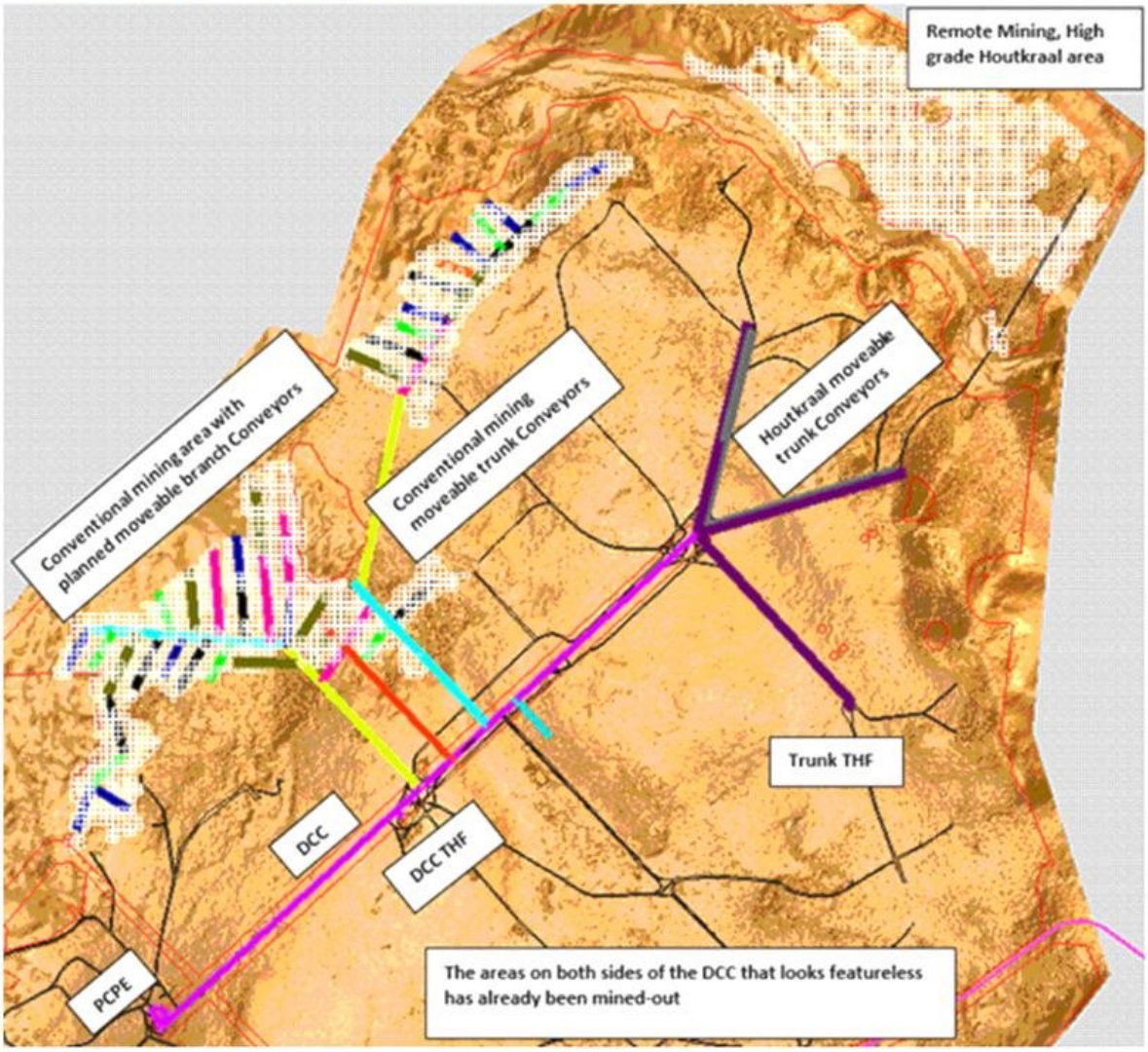
East Mining

Currently only the free flowing and lightly consolidated RAS is extracted at the East Mine. At the cessation of East RAS mining in approximately 2025 the underlying more consolidated East OFS mineralization will be extracted.

The present mining method entails front-end loaders loading and carrying aeolian sand to moveable grizzly feeders. These feeders discharge onto shiftable branch conveyors that feed onto a semi-permanent trunk conveyor or directly onto the dual carry conveyor

(DCC). The trunk conveyor system feeds onto the dual carry conveyor (DCC), which in turn feeds the ore via a stockpile feed conveyor onto the PCP East run of mine (ROM) stockpile. The free-standing grizzly feeders are moved by a track-dozer along the branch conveyors to maintain a maximum haul distance of 100m. A recent layout of the East mining and conveying system is shown in Figure 9 below.

Figure 9: Layout of the East RAS mining and conveyors



Mechanised strip mining is performed in several areas simultaneously after the top 50 mm of topsoil has been dozed off. Where underfoot conditions allow it, front-end loaders simply scoop up the RAS, and carry it over distances of less than 120 m to the nearest grizzly that discharges onto a branch conveyor system. At greater distances (>120 m), or unsuitable underfoot, a truck and shovel method is used to haul and stack ore within reaching distance of a front-end loader. No benching is needed.

The ROM feed to the PCP is transported on the bottom strand of the DCC, while the plant tailings are simultaneously returned on the top strand of that conveyor. The DCC length is currently 6.4 km. The conveyor is powered by four 400kW variable speed drives to discharge bins, from where ADTs collect and haul the plant tails to the backfill areas. The mining sequence is completed by the placement (front-end loader and trucks) and level-dozing of topsoil, after which the rehabilitation process starts along with the placement of windbreak nets. Clearing of vegetation ahead of the mining faces and rehabilitation is carried out concurrently with the mining.

The scheduling of the East RAS mining targets a consistent feed grade blend between the mining areas considering the optimization of the conveyor infrastructure and available EMV fleet. The primary production fleet at the East Mine varies with mine pit location and haulage distances but will typically consist of front end loaders, articulated dump trucks, bulldozers and excavators.

West Mining

The West Primary Concentration Plant (PCP West) receives ore from mining of four pits operating within the West Mine. Mining consists of loading ore into haul trucks that discharge into the ROM tipping bin.

By means of an apron feeder ore passes through a vibrating grizzly with the coarse material passing through a primary mineral sizer to -300mm. A secondary mineral sizer, reduces ore down to -150mm and feeds the trunk conveyor to the PCP West stockpile, currently over a distance of 4.3 km.

After mineral separation, the remaining 90% is conveyed on the tailings deposition system back to the mined-out areas for rehabilitation purposes or is utilised to build clay residue dam walls.

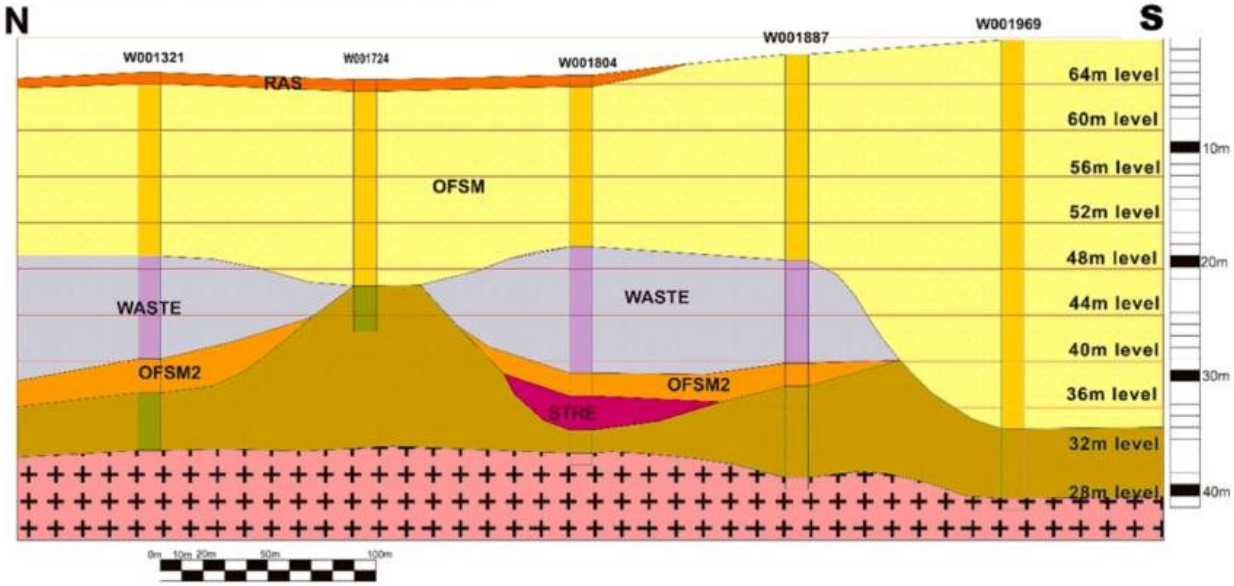
The mining sequence starts with strip-dozing the topsoil (top 50 mm of soil) from the surface Red Aeolian Sands (RAS), which is stacked for rehabilitation at a later stage. The remainder of the RAS is mined with a front-end loader and truck combination.

For the deeper ore, mining is accomplished by conventional strip mining, utilising 300-ton excavators, front-end loaders, dozers, and 100 ton and 40-ton dump trucks. Multiple benches, with a height up to 5m, are excavated. It has been established that the double bench mining method increases production and reduces unit cost through less hard padding preparation.

Underlying the RAS is the Orange Feldspathic Sands Mineralised (OFSM), also called “dorbank”, is lithified and often requires rip dozing. The bulk of the OFSM is mined with two mass excavators and six haul trucks, in a multiple- 4 m single- or double bench style. Internal sub-economic waste (OFSW) is stripped with a separate excavator-truck fleet and used as backfill. The softer, exposed ore below, which include the OFSM2 and strandline deposits, are also mined with the mass excavator-truck fleet.

Figure 10 below shows a schematic cross-section of the West mine.

Figure 10: Typical cross-section of the West Mine.



The tailings from PCP West are transported on a conveyor system back to the mined-out areas for rehabilitation purposes or is utilised to build clay residue dam walls. The conveyor system consists of a central conveyor, called the Extendable conveyor that runs southwards along the general mining direction, with two perpendicular, shiftable conveyors that can also be extended, resulting in three discharging points for tailings placement. These shiftable conveyors are moved along the Extendable conveyor and discharge the tailings into the mined-out areas. The West Shiftable conveyor is utilised for constructing the residue dams and the East Shiftable conveyor is used for the bulk of the backfill, which covers the greater area of the mined-out areas. Dozers are used to push the tailings beyond the immediate conveyor discharge point, up to 80 m. The mining sequence is completed by the placement (front-end loader and trucks) and level-dozing of topsoil, after which the rehabilitation process starts with the placement of windbreak nets.

Aside from reliable tonnage delivery, mining aims to provide an even feed grade as well as a balance of harder material, clay fines content and oversize.

The upper layers of the West ore body is generally above average grade but with higher grades of related oversize and clay fines residues, whereas the basal part of the West ore body by comparison, is generally lower grade but with low levels of oversize and clay fines.

The relative tonnages between areas is a balance considering the following parameters:

- zircon and ilmenite grades,
- oversize (LT 35% +20mm) and clay fines content (LT 15%),
- waste stripping ahead of the Extendable conveyor and East Shiftable conveyor,
- distances to the ROM tip,
- position of mining blocks in relation to advancing tailings.
- infrastructure location
- available EMV fleet

Deposits mined at Namakwa have little issue with digging conditions and therefore geotechnical work is rarely required for the mining mechanical equipment.

The ore body lies above the surrounding groundwater level, the quality of which is too salty for human or animal consumption.

14 Processing and Recovery Methods

East Primary Concentration Plant (PCP East)

Aeolian sand is received from the Mine and fed to the plant from the ROM stockpile by means of vibrating feeders. The feed passes through a trommel screen that removes the +6mm material and then to two linear screens, which further removes the +1mm material. The oversize from both the linear and trommel screens is discharged onto the tailings conveyor. Undersize from the two linear screens is de-slimed with the -45µm material going to thickening units. The +45µm is pumped to the spiral section which comprises two parallel streams each containing rougher, middling, cleaner and scavenger spiral gravity separator banks for the recovery of HM.

Spiral tailings go to de-watering cyclones then de-watering screens prior to discharge onto the tailings conveyor. The concentrate is pumped to either an emergency stockpile, from where it is trucked to the Secondary Concentration Plant (SCP), or directly into the feed CD-tank of the SCP.

West Primary Concentration Plant (PCP West)

This plant consists of two parallel processing streams. ROM is fed to the plant from the ROM stockpile by means of vibrating feeders. A trommel screen removes the +6 mm material. The undersize passes over three primary linear screens, which removes the +1mm material. Undersize is pumped to de-sliming cyclones and then to the spiral section. The cyclone overflow is thickened and pumped to a residue dam.

The spiral gravity circuits comprise rougher, middling, cleaner and scavenger spiral banks . The concentrate produced is approximately 90% HM.

Spiral tailings are pumped to de-watering cyclones then dewatering screens for discharge onto the tailings conveyor, concentrate is pumped to the SCP. Concentrate stock from an emergency stockpile is trucked to the SCP.

For processing harder material the PCP also has 7.3m diameter autogenous pancake scrubber which is fed from the trommel (+6mm) and linear screen oversize (+1 mm) from both the North and South steams. The mill discharge is screened, cycloned and fed to the existing spiral feed tank.

Secondary Concentration Plant (SCP)

This plant receives HMC concentrate from the East and West Primary Concentration Plants (PCPs). The SCP roughly separates the magnetic (ilmenite) from the non-magnetic (zircon, rutile and leucoxene) material.

HMC is fed into the plant via two streams and over linear screens to remove oversize (+1mm) .

Drum magnets (LIMS) then remove magnetite before it enters the WHIMS magnet circuit. This circuit comprises rougher, magnetic, middling, non-magnetic, cleaner and scavenger 16 pole WHIMS that produce a magnetic fraction (typically 91% ilmenite) which is attritioned, to remove clay cemented coatings, before being filtered and pumped to the magnetic product bays.

Excess unattritioned magnetics (UMM) from the WHIMS circuit that cannot be used immediately in the downstream production process is sent to the UMM stockpile for later retreatment. The bulk of the stockpile was accumulated some years ago and contains predominantly ilmenite with some garnet. The stockpile is currently estimated to be 4.5 Mt and is progressively being processed over the next two decades.

The non-magnetic fraction, is sent to the wet gravity spiral circuit for further upgrading. The final non-magnetic product concentrate is typically 55% zircon and 10% rutile. This product is also mechanically attritioned to remove surface coatings and then passed over a belt filter, to remove excess moisture.

The magnetic concentrate uses a stacker/blending system to deposit in five drying bays, and is allowed to dry for four to five days before being trucked to the MSP. The non-magnetic concentrate is diverted from the non-mags conveyor, using a stacker/blending system, into the bay where it dries before being trucked to the MSP.

Mineral Separation Plant (MSP)

The SCP crude ilmenite magnetics are first dried in a paraffin fired fluid bed then rougher processed in a bank of drum magnetic separators to remove garnets as non-magnetics and ilmenite magnetics which are further processed on HTR electrostatic separators to make final product smelter grade ilmenite. The circuitry also has a number of middling and scavenging process streams that are further treated on drum magnets and HTR machines with different settings to recover more ilmenite and reject as much garnet as possible.. The unrecovered ilmenite and garnet ends up in a rejects stockpile.

The SCP zircon rich non magnetics are processed in an entirely separate circuit with no dynamic crossover with the ilmenite circuit. After drying, Induced Roll Magnetic Separators (IRMS) are used to remove iron rich contaminants that would otherwise interfere with the effectiveness of the hot acid leach circuit (HAL) . Dissolution of magnetic monazite and the radio-actives impact on acid effluent is also averted. Of current interest is the development of another circuit to recover monazite from both stockpiled historic reject streams and current HMC production through known separation techniques as monazite has increasing commercial value in the production of rare-earth metals.

In the HAL circuit an iron-rich mineral coating that affects electrostatic separation and contributes to iron contamination of zircon products is removed. An upgraded non-magnetic feed from the IRMS circuit is heated in a drier and fed into a rotary reactor where a sulphuric acid solution is added to the hot sand. The heat of the sand bakes the acid on the mineral surface to form iron sulphate. The leached product is quenched, after which the acid effluent is removed. Residual iron coating that remained after the leaching process is removed by attritioners. The acidic effluent is neutralized with lime.

Next is a wet gravity circuit, the purpose of which is to remove the less dense minerals like quartz, siliceous leucoxene, kyanite, garnet, pyriboles and other low-density nonvaluable minerals. Up front is a hydrosizer from which the coarser underflow contains the bulk of the zircon and is upgraded through a six stage spiral circuit. The lighter and finer minerals in the hydrosizer overflow are processed over two stages to remove quartz and leucoxenes from the fine zircon.

The dry mill is made up of five main circuits: rougher, middlings, zircon, rutile and Zirkwa circuits. The rougher circuit consists of the CoronaStat and MT HTR separators performing the initial separation between zircon and rutile.

Conductors from the rougher stage are fed to the rutile plate circuit which includes the tin/cassiterite removal circuit (HTR) and the silica/leucoxene plus ilmenite removal circuit in the process of producing a pigment grade Rutile product.

The non-conductors are fed to the zircon plate circuit. The middlings have a separate circuit for scavenging zircon and rutile and also feed the Zirkwa circuit with less amenable mineral.

The low TiO_2 non-conductors are fed to the zircon plate circuit which consists of a combination of Electrostatic Plate Separators (EPS), Electrostatic Screen Plate Separators (ESPS), High Force Magnets (HFM) and Induced Roll Magnetic Separators (IRMS). This circuit produces a primary grade zircon and rejects, is combined with the middlings and fed to the Zirkwa circuit.

The Zirkwa circuit treats the rejects from the middlings circuit, zircon plate circuit and the wet gravity circuit secondary concentrate to produce a secondary zircon product and a final zircon reject stream.

The mineralogy, the chemistry and physical characteristics of the Namakwa minerals are quite varied and complex leading to complex interactive MSP circuitry in order to reject trash and sub-specification valuables.

The magnetic feed to the MSP comprises ilmenites at a grade of approximately 90% together with 10% of other minerals (predominantly garnet). By contrast the mineral suite of the non-magnetic feed is much more diverse and in addition to the valuable minerals zircon, rutile and leucoxene, hosts a range of other minerals including garnet, ilmenite, pyriboles, staurolite, monazite, kyanite, cassiterite, titanite, and quartz. Typically, a non-magnetic feedstock contains about 55% zircon; 10%-15% rutile and 10% leucoxene with the significant remainder being other minerals.

The zircon, leucoxene and ilmenite grains display a broad range in their respective compositions. Generally zircon is distinguished by two types namely pure (clear) and impure (metamict) varieties, and although both types contain ~65% ZrO_2 the metamict type hosts undesired Fe, U, and Th of up to 0.05% levels. Silica-rich intergrowths commonly lower the titanium quality of leucoxene (to 85% TiO_2 and lower), and similarly, Ti-poor ilmenite degrades the titanium content of the final ilmenite product to approximately 46% TiO_2. Fe-Al silicate coatings are present on all mineral grains as surface deposits which impacts the quality of zircon and ilmenite products, but also impairs electrostatic and magnetic separation performance.

Apart from having diverse chemical compositions, the various minerals also exhibit different physical properties and mineral separation is accomplished by exploiting these.

The SCP magnetics surplus stream gets reprocessed through a small standalone scavenger plant with the crude ilmenite output being blended with SCP crude ilmenite processed through the MSP.

The recovery conversion of Mineral Reserve to Saleable Product is based on empirical calculations and historical information retrieved from reconciliations.

Metallurgical recoveries are dependent on a variety of factors. These factors that affect recoveries are listed as follows:

- Clay fines content
- Oversize
- Other content and type
- Material type
- Other geometallurgical parameters such as physical and chemical mineral characteristics
- Cementing and staining agents

The operation runs 24 hours per day, 365 days per year and personnel cover shift operations, day crew, maintenance and various services.

Haulage of HMC to and mineral product from the MSP are managed by contract.

Figure 11 shows an abridged Schematic Flowsheet for the Mineral Processing at Namakwa Sands Operations.

the MSP and a local farm. The allocated maximum demand is 7.5MVA for the MSP and the normal operating load is approximately 3.5MVA. For PCP East: Max = 5.2MVA, normal operating = 3MVA, for PCP West: Max = 10.5MVA, normal operating = 9MVA and for SCP: Max = 22MVA, normal operating = 12MVA

The minerals are transported with purpose-built trailers and trucks between the Mine and MSP. The trucks travel on a tar seal road constructed for this purpose.

A Sishen-Saldanha railway line connects the MSP and Smelter sites. The minerals are transported from the MSP to the Smelter/port storage in closed container trucks, to prevent mineral losses and contamination.

Seawater is used in the primary and secondary separation processes and is pumped via the seawater pump station installation close to the Mine.

16 Market Studies

The principal commodities titanium and zircon are freely traded, at prices and terms that are widely known, so that prospects for sale of any mineral production are virtually assured.

Tronox is the world's second largest producer of TiO_2 based pigments and has the specific strategy of being predominantly vertically integrated. This means that its own mining production will provide the bulk of the titanium feedstock to its 9 pigment plants, located around the globe. Tronox Management Pty Ltd now markets all mineral products sold emanating from the Namakwa mine. However with the integrated pigment strategy, this predominantly relates to the range of zircon products. The Namakwa zircon products are highly sought for use in tile ceramics.

Tronox routinely uses the services of various industry trade consultants to closely monitor and report on global production of titanium minerals and zircon as well as reporting on the current global supply and demand status, plus projections of new projects to come on stream, both timing and capacity. Export and import data by country is monitored. As noted earlier, zircon, TiO_2 feedstock and TiO_2 product pricing are internationally traded, specialized commodities. Generally speaking, the prices of our products are substantially in line with the prices for each of these products published quarterly by TZ Minerals International Pty Ltd (TZMI) and other independent consulting companies who track the mineral sands, titanium dioxide and coatings industries.

The ilmenite product is smelter grade and converts well to high grade slag for use in chloride pigment plants. Natural Rutile has been marketed in the past with a TiO_2 content of 94+% but is currently blended with leucoxenes and consumed internally by Tronox.

The bulk of Namakwa zircon is classified as Premium Grade with a slightly higher contaminant grade product Zirkwa also produced. Namakwa zircon has consistently sold in line with market pricing.

17 Environmental studies, permitting and plans, negotiations, or agreements with local individuals or groups

Tronox Namakwa Sands' mining operations are covered by three Mining Rights issued by DMRE on 18 August 2008 and 30 March 2016. The Mining Rights cover 19,144 ha of land of which ~14,000 ha has been authorised for mining.

Namakwa Sands is covered under a number of approved EMP's, EMP addendums and Environmental Authorisations. These include:

- 1990 Environmental Impact Report
- 1992 Rehabilitation Plan
- 1994 EMP Addendum to include the MSP
- 2002 Revised EMP
- 2005 EMP Addendum for the Effluent Treatment Plant & Gypsum disposal
- 2005 EMP Addendum for the P1000 project
- 2006 EMP Amendment pertaining to various issues on the bulk storage of fuel
- 2011 Expansion of the Mining Footprint EMP (Applicable to Mine only)
- 2011 UMM Plant EMP Addendum (Applicable to Mine only)
- 2011 UMM Dryer EMP Addendum (Applicable to Mine only)
- 2013 Quartz Reject Plant EMP Addendum (Applicable to MSP only)
- 2016 Satellite Expansion (Expansion into Satellite Deposits) (Applicable to Mine only)
- 2018 East OFS Infrastructure (Applicable to Mine only)
- 2018 RSF6 and associated West Mine Infrastructure (Applicable to Mine only)
- Water Use Licenses (Mine and MSP)
- Air Emission Licenses (Mine and MSP)

In terms of the EMPs and authorisations, various audits (internal and external) are conducted to ensure compliance with the conditions of these authorisations. There are no issues of noncompliance outstanding.

The Namakwa operations are situated within the Succulent Karoo, part of the Cape Floristic Region (CFR), which is known for its large diversity of plants. Namakwa Sands propagates indigenous plants in an in-house nursery, transplants indigenous plants from areas to be mined in future and sows indigenous seeds as part of the rehabilitation programme to re-establish the natural biodiversity.

Biodiversity audits are undertaken periodically to gain insight into the recovery of the Succulent Karoo veldt. The goal is to achieve sustainable small stock grazing capacity and species counted in rehab are up to 70% of pre-existing baseline audit.

Soils are generally poor in nutritional value. Topsoil however plays a significant role in the success of rehabilitation. The top 50mm of the sandy aeolian soils contains 80% of the veld seed resource. A minimum of 50mm topsoil is therefore collected for rehabilitation purposes prior to commencement of mining activities and/or the establishment of any infrastructure. Seed viability deteriorates rapidly during soil storage, necessitating storage periods of three months or shorter.

Rehabilitation Programme

The EMPR (East Mine and West Mine rehabilitation plans and schedules) requires Namakwa Sands to rehabilitate continuously with mining advance. The first step in rehabilitation is the backfilling of tailings to generate a soft undulating landscape. Topsoil is then placed and levelled on the backfilled tailings. Windbreaks are then installed to minimize the impact of strong winds on topsoil and newly established vegetation. Re-vegetation includes the sowing of indigenous seed, transplantation of propagated plant from an in-house nursery and from undisturbed areas, clay fines dam walls will be sloped to 1:5 gradient and re-vegetated during LOM.

Rainfall is not the single most important source of precipitation. Heavy dewfalls and sea fogs occur over approximately 100 days of the year because of the moderating effect the cold Atlantic ocean has on temperatures. The dewfalls and sea fogs supplement the rainfall resulting in a cumulative average annual precipitation of approximately 280 mm per annum.

Groundwater Monitoring

Groundwater is regularly monitored across all sites. There are elevated levels of some analytes at the MSP seeping from small storage dams. This water is managed through reclaim and recycling back to the process. At the mine there is a certain amount of seepage of process saltwater that escapes from the RSF dams. The natural ground water is quite salty and too high for unacclimatized stock usage. These dams are only a short distance from the coast where the water was originally sourced. The use of seawater during heavy mineral separation also results in salt being returned to the mining excavations in the backfill tailings which, along with the need to be able to easily convey, is why the return material is dewatered to a handleable extent.

Dust Monitoring

Because of site-specific climatic conditions and the nature of activities associated with mineral sand mining, fugitive dust is managed to reduce impacts outside the site boundaries. The rehabilitation netting works well to reduce windspeed at ground level for the betterment of plant growth and minimizing fugitive dust and sand. A system of monitoring with bucket catchment units around the mine perimeter is in place.

Ionising Radiation

Namakwa Sands operates under a nuclear authorisation issued under the terms of the National Nuclear Regulatory Act (Act No 47 of 1999).

Waste streams at the Mine and the MSP, and product material such as primary and secondary zircon and rutile, are described as NORM (Naturally Occurring Radioactive Material). Low-level radioactive and chemically inert mineral tailings material from the Secondary Concentration Plant (SCP) at the Mine is blended back into the primary sand tailings. Adequate dilution is obtained since primary tailings constitute more than 90% of all tailings. This is returned to the mining voids and the surface areas are rehabilitated as required in the approved EMPR. The bulk of the radioactive waste, which has significantly higher radioactive levels is generated at the MSP.

The mineral monazite naturally contains levels of uranium and thorium. This mineral primarily goes into stockpiles at the MSP which because of the much larger concentrations of rutile, zircon and ilmenite remain at site for further reprocessing. The treatment of the non-magnetics stream through the HAL process at the MSP results in some acid solubilized uranium and thorium however this is converted back to an immobile solid by neutralization with lime, filtration and inground disposal at Brand-se-Baai according to the approved EMPR.

Mine Closure

Mine closure cost has been estimated by consultants, using an internationally accepted closure assessment method. Closure items and components with relevance and commonality in terms of location and closure objectives are categorised into closure domains. The following closure domains are used; 1: Offices and Infrastructure; 2: Plant Infrastructure; 3: Water Infrastructure; 4: Waste and Product Storage Areas; 5: Conveyors; 6: Linear infrastructure, 7: Residue Storage Facilities (RSF's) and associated infrastructure and 8: Mining Areas. Domain 9 deals with post-closure monitoring aspects and 10 with cost of Risk and the cost of Regulatory Aspects associated with a closure application.

NEMA GNR 1147 prescribes that mine closure planning should be done over the total scheduled LOM. This requirement necessitates the inclusion and differentiation of the rehabilitation, the decommissioning and finally, the aftercare phase.

The concurrent rehabilitation of the mine voids the RSF's and stockpiles is scheduled to take place in the operational LOM period, whilst the decommissioning of the PCP East, PCP West, the West RSF 6 - 9, the planned East OFS RSF and the MSP with associated infrastructure will be initiated when reserves are depleted.

The unscheduled closure cost is calculated as the cost of immediate, unplanned closure of all domains inclusive of decommissioning and restoration. The scheduled closure cost liability is made up of closure costs incurred during the scheduled LOM, followed by final closure, rehabilitation and or aftercare phases.

Unscheduled closure cost is estimated at US$14.5M. The scheduled closure cost estimate is US$7.6M

Community

The local procurement targets as set out in the Mining Charter for capital goods and procurement of services are being met.

For employment, the proportion of historically disadvantaged South Africans (HDSA) was 84% in total and well exceeded the required Mining Charter target levels of 40%.

18 Capital and Operating Cost

As the operation commenced in 1994 the project capital is no longer a relevant factor in determining the economic viability of the property. However, the economic analysis allows for ongoing minor stay in business capital and also a pre-feasibility estimate of a range of US$150 to US$200 million for the East OFS mine extension project. The operating costs are known and no longer subject to estimate. Costs used in the economic analysis come from Tronox internal cost accounting systems.

19 Economic Analysis

For the financial modelling that supports the current Reserves, a range of mining block schedules are prepared by the senior mine development engineer. These schedules contain information on ore tonnes and grades, mineral assemblages and clay fines levels as well as other information that may impact on throughputs, recoveries and costs. Historical performance validated forecasting models have been used to predict a range of physical performance parameters for future ore blocks to be mined over the remaining life that are used as input drivers to the financial modelling and economic validation. Grouped cost drivers, physical and revenue parameters used in the modelling.

There are many mineral sands mines operating worldwide. Many as standalone mineral sales operations producing mineral products similar to those emanating from Namakwa. With so many operations selling titanium and zircon mineral products on the open market Tronox chooses to value its ore reserves on the basis of what it would have to pay to buy the mineral products, if it didn't produce and use them itself. Mineral pricing data is readily available through a number of industry sources and from Tronox own marketing team.

The current Namakwa orebodies are expected to be depleted by approximately 2049.

Key cost assumptions, macro and mineral price assumptions

To determine the economic viability and cash flows of the Namakwa project, the Company utilized management's best estimates of the following key assumptions for the mining operations: 1) mining and waste material removal cost, 2) primary plant variable cost, 3) concentrator fixed costs, 4) tailings fixed costs, and 5) maintenance, overhead and support services costs; and for the separation plants, the assumptions are as follows: 1) plant variable costs, 2) SCP and MSP fixed costs, 3) HMC haulage rates and 4) maintenance, overhead and support services. Other key assumptions were mineral royalties, distribution costs, mine and concentrator and MSP capital spending, tax rates, and exchange rates. Cash flows are positive for all years in the Life of Mine Plan.

The physical mining and processing parameters used in the life of mine plan and applicable to exploiting the reserves result in a mine life of 25+ years and product yields from in ground mineral to saleable products as follows:

- Ilmenite 68%
- Zircon 63%
- Rutile 63%

Sensitivity analyses were conducted using variants such as commodity price, operating costs, capital costs, ore grade and exchange rates. As a result of these analyses, the project was determined to be economical viable in all scenarios.

20 Adjacent Properties

Not applicable.

21 Other Relevant Data and Information

Glossary of Terms summarised in Table 5.

Table 5: Glossary of Terms

Term	Definition
AC	Air Core drilling
amsl	Above mean sea level
Clay Fines	Clay and Fines finer than 45 micron, often suspended in water
CPI	Consumer Price Index, a measure of inflation
CRM	Certified reference material
DFS	Definitive feasibility Study
DMRE	Department of Mineral Resources and Energy
DTM	Digital Terrain Model
DWAF	Department of Water Affairs and Forestry
EBIT	Earnings before Interest and Tax
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
GPS	Global Positioning System
GSSA	Geological Society of South Africa
HM	Heavy Minerals
HMC	Heavy Mineral Concentrate
HTR	High Tension Rolls, a high voltage electric charging mineral separator
IWULA	Integrated Water Use License Act
JORC Code	Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves
LOMP	Life of Mine Plan
Mbcm	Millions of bank cubic metres
ML	Mining Lease
MSP	Mineral Separation Plant
Mt	Million tonnes
MWh	Mega Watt Hour, a unit of electricity consumption
Neighbourhood Analysis	Method of classifying multivariate data according to a given distance, provides optimal parameters for modelling.
NYSE	New York Stock Exchange
OFS	Orange Felspathic Sands
OFSM	Orange Felspathic Sands Mineralized
OFSM2	Orange Felspathic Sands Second Mineralized layer, beneath waste
OFSW	Orange Felspathic Sands Waste
Ordinary Kriging	A statistical method of relating data points based on distance of separation
PCP	Primary Concentration Plant
PFS	Pre Feasibility Study
QA/QC	Quality Assurance/Quality Control
QEMSCAN	Quantitative. Evaluation of Materials by Scanning. Electron Microscopy
RAS	Red Aeolian Sands
RET	Recent Emergent Terrace, often coastal sand dunes
ROM	Run of Mine
RSF	Residue Storage Facility, often for clay fines
SAMREC	South African Code for the Reporting of Exploration Results, Resources and Mineral Reserves
SCP	Secondary Concentration Plant
Strandline	Line of concentrated heavy minerals usually associated with historical shorelines

Term	Definition
THM	Total Heavy Minerals
VHM	Valuable Heavy Minerals (total of Ilmenite+Rutile+Leucoxene+Zircon)
XRF	X-ray fluorescent Analysis
Yield	The recovered weight of material to a saleable product

22 Interpretation and Conclusions

The declaration that the Namakwa operations have 703Mt of ore reserve at 2.90% ilmenite and 0.63 % zircon and resources of 306Mt at 2.05% ilmenite and 0.43% zircon is well supported.

The minerals in the deposit show a limited existence of inclusions and composite grains which does impact on mineral recoveries and qualities. There is modest Fe staining of the zircon which responds well to HAL treatment. The ilmenite performs well in making a high TiO_2 slag.

Namakwa has a good record for rehabilitation of past mining areas, groundwater management, control of dust and radiation management. Relationships with key stakeholders and government regulators are also in good standing. The LOMP runs through to 2049 however, closure and rehabilitation plans and provisions for unplanned closure are appropriately made.

On a minerals only basis, financial modelling shows that future reserves are profitably mineable with the existing equipment and infrastructure.

The Namakwa operations are a key part of the Tronox vertically integrated pigment production process.

23 Recommendations

That geological work continues to better define the economic margins of the resources, looking for inclusion, at least in part, as reserves to further extend mine life.

24 References

List of References summarised in Table 6

Table 6: List of References

Title
Tronox Namakwa East OFS Project Pre-Feasibility Study 2020
Tronox Namakwa Mine Closure Plan 2020
Tronox Namakwa Operations 2021 Annual Resources and Reserves Report

25 Reliance on information provided by the registrant

The preparation of this Technical Summary Report relies on information provided by Tronox and its employees in the following areas, as they are reasonably outside the expertise of the qualified persons.

- Marketing plans and pricing forecasts as key inputs to the economic modelling
- Environmental performance commitments and mine closure costing
- Maintenance of licenses and other government approvals required to sustain the LOMP
- Capital to progress the mining of the East OFS deposits.

26 Date and Signature Page

This report titled “Namakwa Technical Report Summary” with an effective date of December 31, 2021 was prepared and signed by:

/s/ Carlo Philander

Carlo Philander, Regional Manager Mineral Resource Development
Dated at Koekenaap, Western Cape, South Africa
February 22, 2022

KZN Technical Report Summary

1 Executive Summary

The KZN mineral sands project commenced operations at Hillendale in 2001 had transferred to the nearby Fairbreeze site in 2015. This utilized the existing infrastructure at Empangeni, being a fully functional mineral separation plant for zircon, ilmenite and rutile products and smelting operations using two DC arc furnaces for the production of TiO_2 slag and pig iron, on the same site. The majority of the equipment from Hillendale was also put into service at Fairbreeze.

Being situated on an historical coastline the ore body is made up of ancient dunal mineral sands deposits, eminently suited to hydraulic mining and wet gravity concentration.

There are 2 Mining Rights covering the mining and processing operation and are held 100% by Tronox KZN Sands, a wholly owned subsidiary of the Company.

The current reserves are 217Mt tonnes at an average grade of 5.5% THM. The current resources, additional to the reserves tonnage, are 107Mt tonnes at 3.7% THM and the current Life of Mine Plan extends out 15 years.

2 Introduction

This report has been prepared by Tronox Holdings Plc in compliance with the US Federal Commission's modernization of reporting rules for mineral assets located at Fairbreeze in KwaZulu-Natal, South Africa.

Information used to support this technical summary report includes the annual Mineral Resources and Reserves report listed in the references section of this report.

Mineral Resources and Mineral Reserves as of 31st December, 2021 are summarised in Table 4 and Table 5 in section 11 and section 12 respectively of this report

A Qualified Person works at the Fairbreeze site and frequently visits the mining areas. Discussions with site management on resource utilisation and optimisation opportunities are held regularly. During the periodic drilling activities, a qualified person regularly attends site activities.

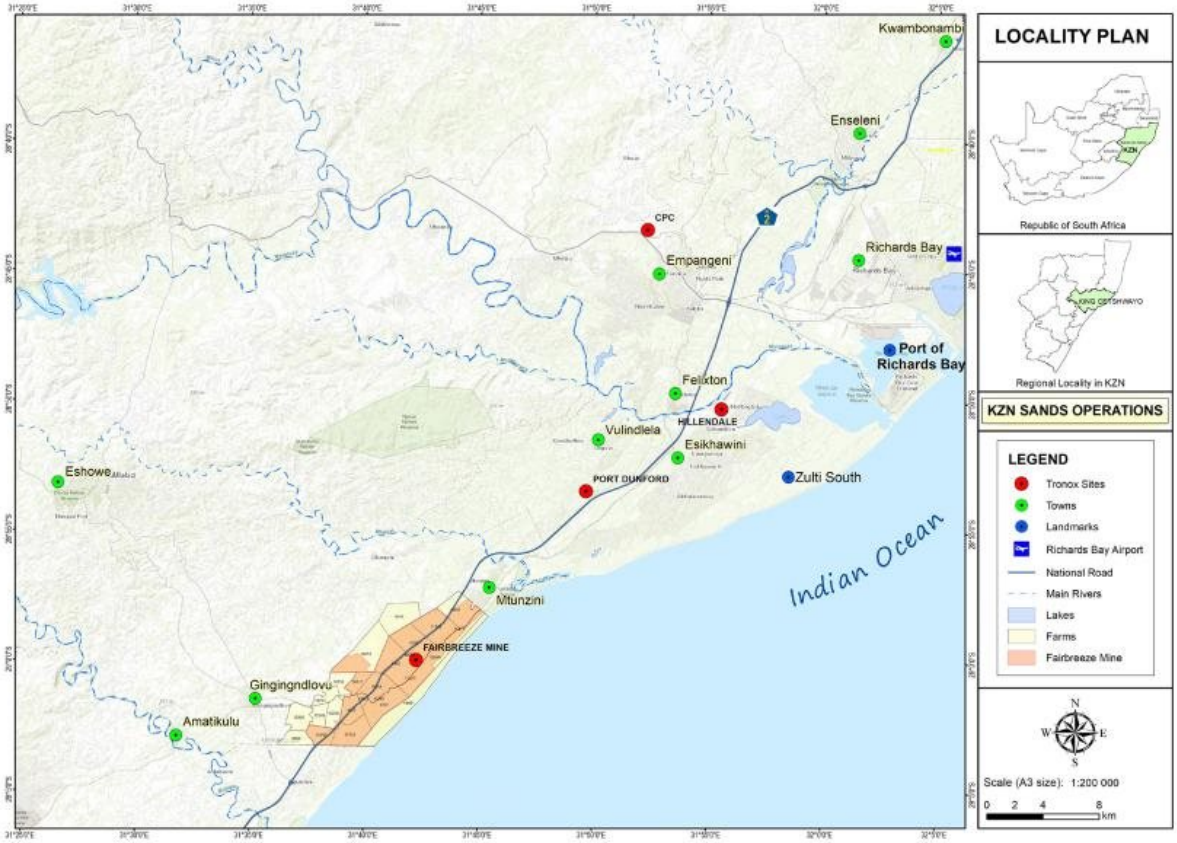
3 Property Description

Tronox KZN Sands operations are wholly owned subsidiaries of Tronox Holdings Plc which include:

- Fairbreeze Mine, immediately south of the Mtunzini township with the Primary Wet Plant (PWP) situated a further 8 km south of Mtunzini. A hybrid mining method that utilizes track dozers to break lightly cemented ore layers in combination with high-pressure hydraulic mining using water monitor guns to slurry the ore for gravity recovery of heavy minerals at the Primary Wet Concentrator (PWP).
- The Central Processing Complex (CPC), 50 road km north of Mtunzini, just outside the town of Empangeni, is where heavy mineral concentrates are processed into mineral products and ilmenite is further converted to titanium rich slag and pig iron in two direct current (DC) arc furnaces. The laboratory and mineral testing facilities are also located at CPC.

See Figure 1 on next page.

Figure 1: Location Map



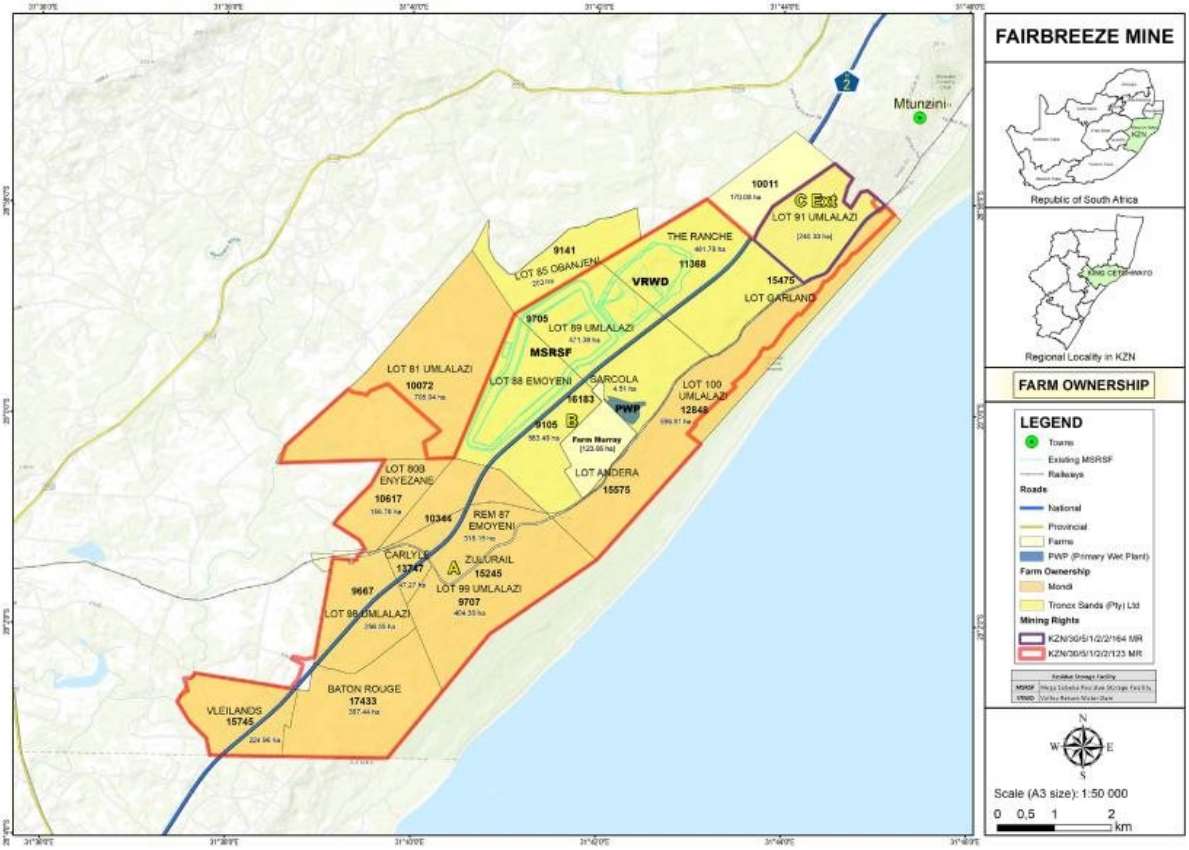
Mining tenements in South Africa are managed at a national government level. In KwaZulu-Natal, Mining Rights and Prospecting Rights are granted and administered by the regional office of the South African Department of Mineral Resources and Energy (DMRE).

The Mining Rights for Fairbreeze are shown in Table 1 and Figure 2.

Table 1: Tronox Mining Rights for Fairbreeze

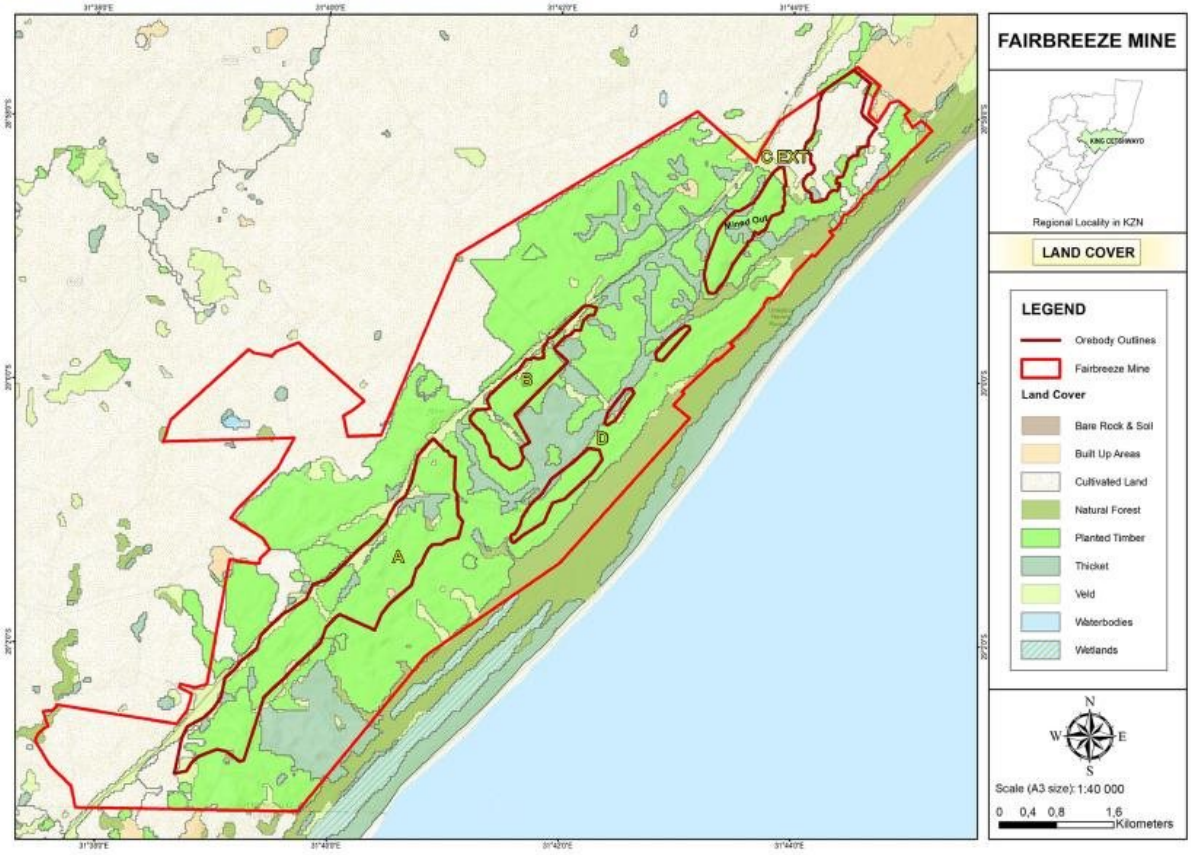
Area/Farm	DMRE Ref. no.	Area (ha)	Current status
Fairbreeze A, B, C, D	KZN 30/5/1/2/2/123 MR	3,810	expires 24 March 2035
Fairbreeze CX	KZN 30/5/1/2/2/164 MR	231	expires 04 August 2039

Figure 2: Mining Rights and Surface Ownership



All deposit areas are largely covered by eucalyptus plantations and sugar cane to a lesser extent (see Figure 3). An agreement to conduct business exists between Mondi Ltd and Tronox KZN Sands for the properties within the Fairbreeze Mining Right area.

Figure 3: Land Use In Relation to Mineral Resource Outlines



The minerals in South Africa belong to the government and Tronox is obligated to pay a royalty to the South African Revenue Services (SARS) based on the sales of final mineral products. The actual royalty payable depends on the Tronox KZN Sand's EBIT (Earnings before Interest and Tax) adjusted for capex redeemed. The royalty percentage ranges between a minimum of 0.5% to a maximum of 7%.

4 Accessibility, climate, local resources, infrastructure and physiography

The Fairbreeze area is characterised by a ridge situated about 2.5 km inland from the present coastline which has been dissected by streams to leave smaller free-standing dunes. The dunes generally slope toward the sea from a maximum height above sea level of 109 metres. The regional climate can be described as sub-tropical receiving an average of about 1 100 mm rain /annum at Mtunzini. On average, rainfall occurs for about 20 days in January down to 10 days in July. January temperatures have an average daily maximum of 27°C down to 22°C minimum. In July the average maximum is 22°C down to minimums of around 17°C.

An extensive road network services the greater Richards Bay - Empangeni - Mtunzini area. The national road, N2, serves as the main vehicular access route to the Fairbreeze Mine.

Railway networks in and around the region are suitable for the cargo requirements of the harbour and local industry and are directly connected to the national network for import/export purposes.

Flights can be accessed from Durban King Shaka Airport or Richards Bay Airport.

Electricity supply is drawn from the national ESCOM grid for all operations. Water supplies are drawn from Mhlathuze Water for mining operations and via the local municipality for the CPC operations.

Infrastructure availability is further disclosed in section 15.

5 History

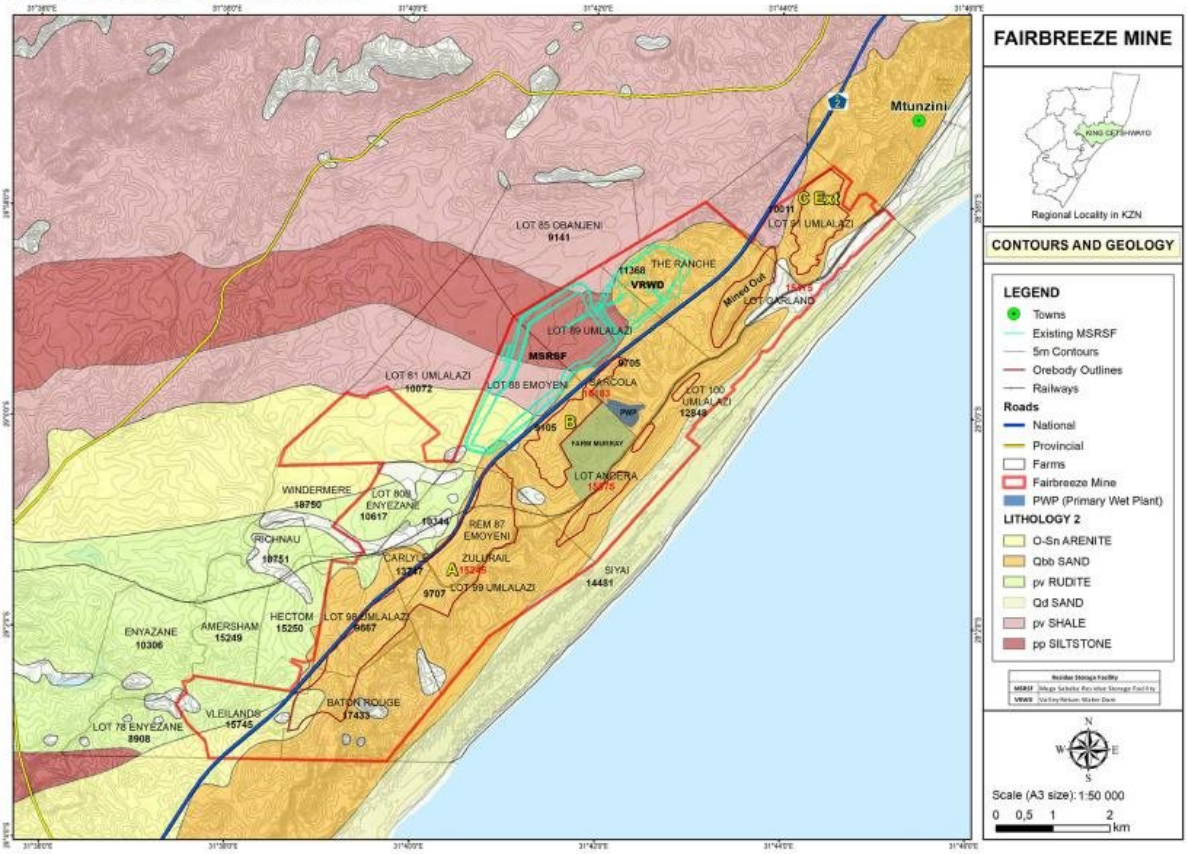
Natal Mineral Sands (NMS), prospected for mineral sands on Hillendale and Fairbreeze in the northern coast of KwaZulu-Natal during the 1980's. Iscor Limited purchased NMS in 1994 and mining activities commenced in 2001 at the Hillendale Mine. In 2012, Tronox announced the acquisition of 74% of KZN Mineral Sands operations. Production commenced at Fairbreeze in 2015 and in 2021 Tronox acquired the whole of the remaining portion it did not own of the KZN Sands operations.

6 Geological Setting, Mineralisation and Deposit

The Fairbreeze deposits consist almost entirely of older (Pliocene parent) Berea-type red sands, which have been exposed to a long period of weathering resulting in the disintegration of the original components to form silt-sized particles and clay. Progressive enrichment in the swash zones of several beaches, which developed along the large coastal beach/dune system, resulted in the concentration of heavy minerals. See Figure 4 for general geology of the area.

Heavy minerals, derived from weathering of inland rocks and sediments, were deposited into the ocean by the Tugela River, concentrated because of progressive enrichment in the swash zones of several beaches, which developed along the large coastal beach/dunal system. Ilmenite, zircon and rutile represent the primary valuable heavy minerals (VHM) of this deposit.

Figure 4: Geology of Fairbreeze Area



Collectively, the Fairbreeze deposits span 526 ha, with a total length of more than 15 km, striking 34°, and reaching 630m in width (Table 2). Generally, the different ore bodies have depths close to 30m, and the elevation drops from around the 100 mamsl in the southwest (A and B ore bodies) to around 70m amsl in the northeast (C, CX and D ore bodies).

Heavy minerals are disseminated in the dune systems with general preference of higher concentrations at the ridge of the dunes.

Table 2: Pre-mining dimensions of the Fairbreeze deposits

Orebody	Avg. Depth (m)	Max. Depth (m)	Max. Elevation (mamsl)	General strike (°)	Width (m)	Length (m)	Surface Area (ha)
FBA	33	63	108	30	535	4,500	250
FBB	30	51	94	33	230	2,409	50
FBC (mined out)	25	51	78	35	280	2,160	55
FBCX	28	50	78	30	630	2,000	110
FBD	23	48	68	40	200	4,030	61

7 Exploration

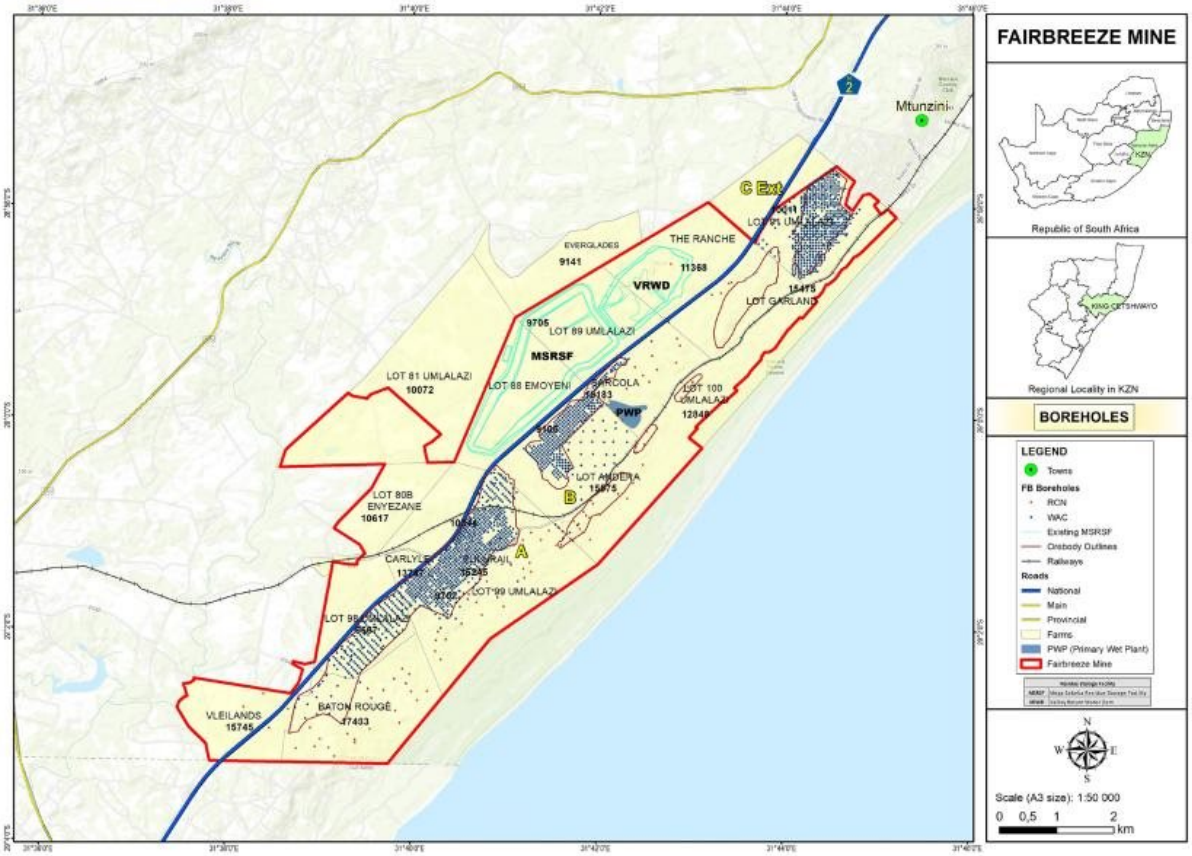
Drilling activities at Fairbreeze are predominantly focused on better definition of deposit edges and drilling for production purposes. Tronox relies on constraining grade variation by drilling on progressively tighter grid patterns. There is no greenfields exploration work to disclose.

8 Sample Preparation, Analyses and Security

Orebodies have been defined by reverse circulation "air core" drilling, with Fairbreeze CX and Fairbreeze B covered on a 50m × 50m grid. Fairbreeze A is largely covered on a 100m × 100m grid with the area targeted for the first two years of mining drilled on a 50m x 50m grid. Holes are drilled vertically using three metre NQ size rods, giving a nominal hole diameter at the bit of 83 mm. Drill samples are collected in one metre continuous intervals from surface stopping at underlying hard bedrock.

Figure 5 shows the drilling density over the Fairbreeze orebodies.

Figure 5: Drilling coverage



Drill samples are collected from the rig cyclone separator at the drill site and weights recorded over 1m sections. Samples are submitted to the sample preparation facility where they are dried and passed through a rotary splitter to obtain a ± 500g representative laboratory sample and the remaining sample is sent for storage.

Samples then progress for laboratory analysis as blind sequential numbers in batches of 66 samples. Included in each batch are 3 duplicates and 3 control samples.

Heavy Mineral Analysis

Oversize material (>1mm) is removed by screening and the <1mm material is analysed for clay fines content using a wet 45-micron screen. The dried +45µm sand fraction is further analysed for the total heavy mineral content (THM) by dense medium separation using tetrabromoethane (TBE) with a specific gravity of 2.96 g/cm3.

The heavy mineral separation aliquots are sent for fused bead XRF element analyses.

Mineralogical analysis

QEMSCAN, an adaptation of SEM technology, which employs a scanning electron microscope to traverse across polished mineral grain surfaces in a mount is used for composite mineral assemblage determination. Software programs convert the metal analyses into mineral species and calculate areas, volumes and relative percentages of the minerals present. QEMSCAN uses the relatively fast assay scan results to match with assays obtained from locally known minerals in a standard suite of samples.

Table 3 shows the average of heavy mineral assemblages for the main ore bodies

Table 3: Average major heavy mineral Assemblage of THM fractions

Orebody	Ilmenite (%)	Zircon(%)	Rutile(%)	Other(%)
FBA	64-74	8-12	5-10	14-18
FBB	62-74	8-12	5-8	14-22
FBCX	64-77	8-12	5-7	11-21
FBD	46-57	5-7	3-5	31-46

9 Data Verification

Control samples of varying clay fines and total heavy mineral grades are prepared in advance of a drilling programme. Results from the prepared control subsamples are used to derive parameters for validation of results received from the laboratory. Every batch of drilling samples submitted to the laboratory include control samples of three different grades. During sample preparation every 20th sample is duplicated to monitor repeatability of sample preparation processes and analytical results. In addition, randomly selected samples are sent on an ad-hoc basis to an external independent laboratory to verify analytical results.

Figure 6, Figure 7 and Figure 8, below show typical duplicate sample comparisons for key drill section attributes.

The half absolute relative difference of paired duplicate results assists to measure the precision of data results. The pairs of half relative differences are expressed as percentage and sorted cumulatively in an increasing order from smallest to largest. The coarse split duplicates should have at least 80% with less than 10% difference. Differences in excess of 10% are investigated. As can be seen in the figures below, the duplicate data exceeds the standard.

Figure 6: Half Absolute Relative Difference Plot of Total Heavy Minerals

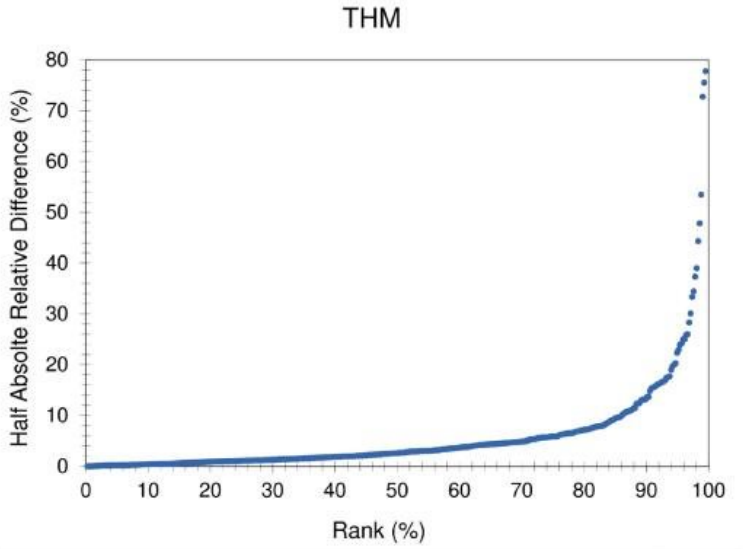


Figure 7: Half Absolute Relative Difference Plot TiO_2 in THM

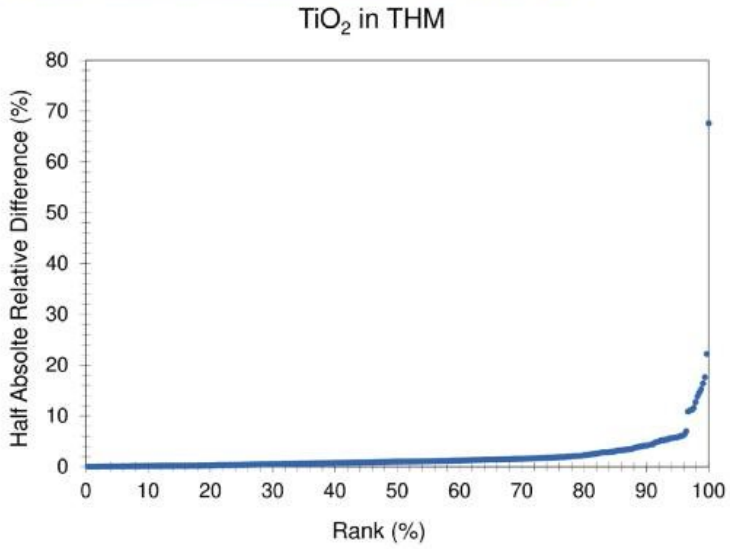
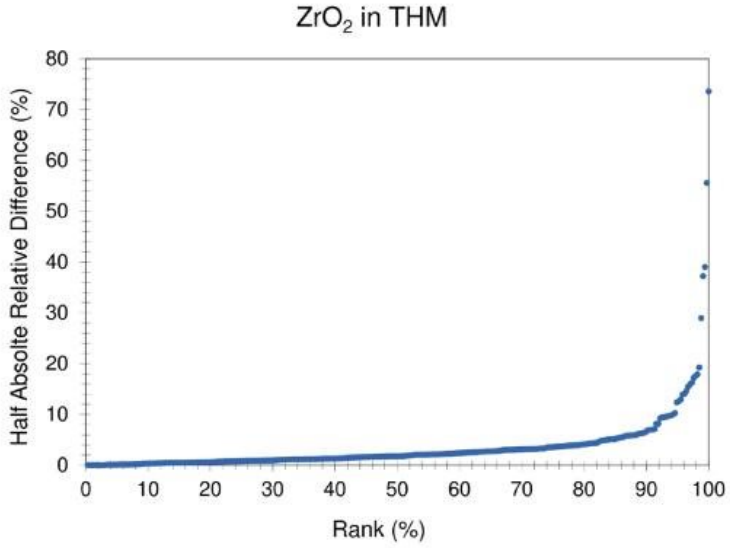


Figure 8: Half Absolute Relative Difference Plot ZrO_2 in THM



The Tronox laboratory at the CPC is ISO 9000 certified for chemical analysis and the laboratory is also certified by the country's National Accreditation Body for Laboratories called SANAS.

In the opinion of the Qualified Person the accuracy of duplicates and standard geological samples along with internal chemical assay standards is of industry standard and the data is suitable for geological modelling resource purposes.

Mineralogical Analysis

Quantitative electron scanning microscopy (QEMSCAN), development work within Tronox since 2006, has refined the conversion of the metal analysis into mineral species.

Mineral assemblages are established by domain.

Ore hardness

Parts of the orebody contain lightly cemented/indurated areas where the high-pressure hydraulic mining method experiences difficulties in maintaining required plant throughput. By mining standards, the ore is still classified as very soft and is easily moved by mechanical equipment such as dozers and front-end-loaders. Mechanically assisted mining is slightly more expensive than solely hydraulic mining and gets costed in when forecasting mining of harder zones.

The indurated material at Fairbreeze can be characterized as having SiO_2 >5.5% and Al_2O_3/MgO>2.1.

The ore impacted by light cementing was determined to be 5% for C Ext and up to 16% in Fairbreeze A. The Fairbreeze B orebody shows discontinuous hardness near surface within high clay fines zones but tonnage impacted is yet to be determined.

10 Mineral Processing and Metallurgical Testing

During the feasibility studies phase of the project, 19 bulk samples from different geological units across the Fairbreeze orebodies were collected for metallurgical pilot testing. An area in the orebody was drilled where after samples were composited to form a bulk sample representing the specific geological units. It was aimed that each composite will produce enough heavy mineral concentrate of about 100kg as a starting mass for all downstream test work. Processing of the samples formed part of data input to the Fairbreeze feasibility studies.

This work continues with composites produced based on annual ore blocks for geo metallurgical testing to give advance knowledge of minor variables likely to impact processing.

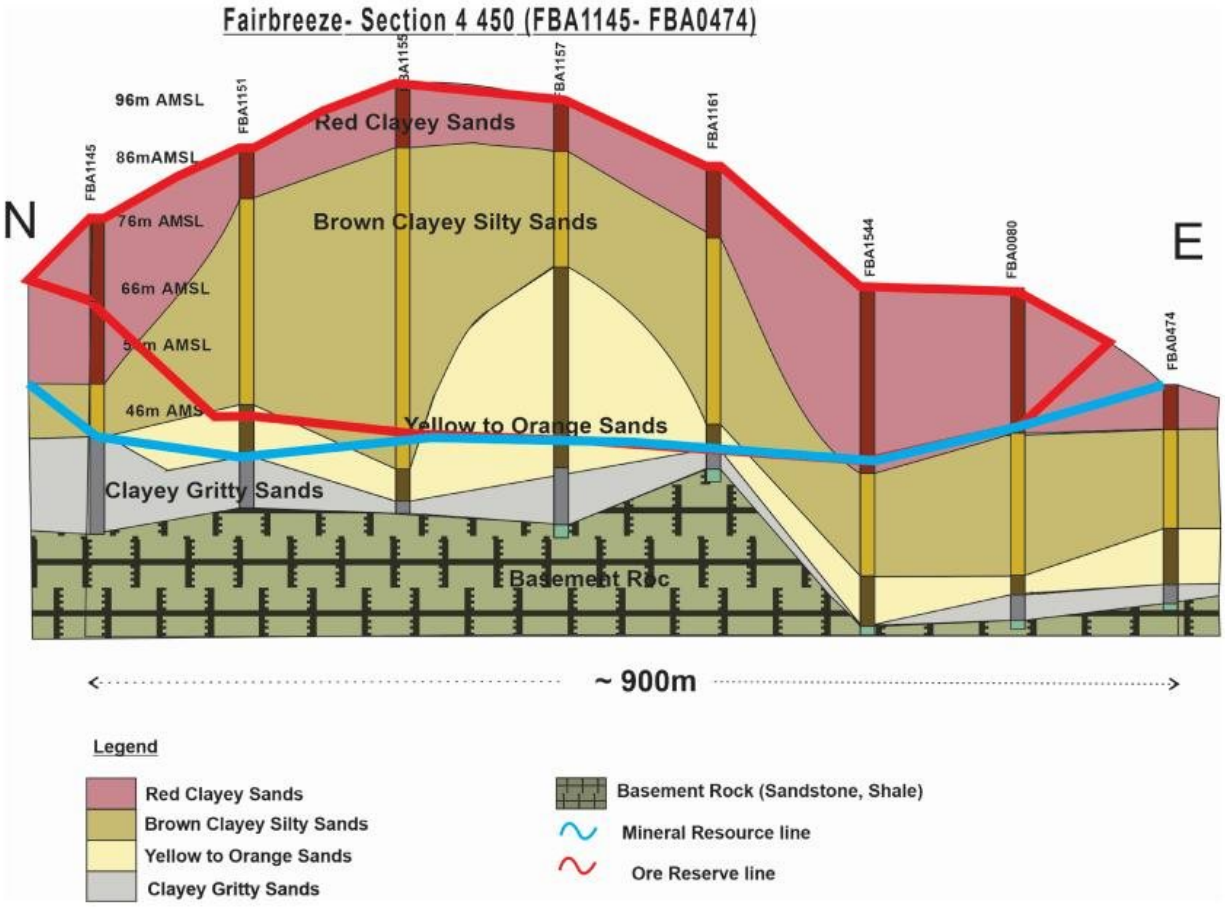
More recently a DFS has been completed into the phase 2 expansion of the operation at Fairbreeze in order to maintain HMC production due to lower THM grades in both the B and A orebodies. The expansion involves increasing the mining and PWP processing rate. Mineral recoveries will be maintained following the expansion as will product quality.

11 Mineral Resource Estimates

Geological Modelling

A model of the different geological domains is generated using geological and mine planning software, Geovia Surpac. Geological and assay data are displayed on graphical sections and unit boundaries/layers are digitised per vertical cross sections, depending on the location and drill spacing. The digitised strings are then joined together to create wireframe surfaces, which are used during the estimation process of the background material, that is, the material not bound by interpreted ore outlines (Figure 9).

Figure 9: Vertical cross section through Fairbreeze A orebody



The orebody outlines, at various ilmenite cut-off grades, are generated in a similar manner as geological wire-frames. A nominal cut-off grade of 1.5% ilmenite is generally applied for defining mineral resources.

Variography

Variography is completed for all domains to determine geostatistical parameters. Typical variogram ranges for THM are greater than 100 metres across and along strand strike. The drilling at 100m x 100m is adequate for defining measured mineral resources.

Block Model Construction

Block models are created in Surpac Geovia geological and mine modelling software. Sub-celling is employed at domain boundaries to allow adequate representation of the domain geometry and volume.

Grade Estimation

Grade estimations was done on the four Fairbreeze deposits from topographic surface to the base of sand at end of boreholes with estimation parameters used for each applicable domain. For Fairbreeze A and C Ext deposits Ordinary kriging was performed for the three iterations whilst adjusting search parameters. The first run is at 65% of the range, second iteration at 100% of range and the third iteration at 150% of the range. The remaining blocks were filled up using the inverse distance squared method and finally the nearest neighbour estimation method. The level of confidence with estimation was allocated in the decreasing order from high in the kriging method and lower in the nearest neighbour.

A similar approach of estimation technique was followed for Fairbreeze B, but all estimation runs are currently based on inverse distance squared method. This will be updated as new drilling data becomes available.

Fairbreeze D is small and has been estimated using the inverse distance squared method at this stage.

Cut-off values

Currently resource volumes are established for cut-off grades of 1.5% ilmenite, which is in line with the breakeven grade.

Density

Consultants carried out the test work on Fairbreeze and recommended the use of dry density of 1.7t/m3 for resource tonnage calculations. Reconciliation of block model tonnages against the primary wet plant show a variance of less than 5%.

Block Model validation

Block grade estimates are validated primarily by statistical analysis and also a visual comparison to the input drill hole data. The following figures illustrate typical graphical comparison of the raw data (borehole samples) and the block model output. In both figures (Figure 10 and Figure 11), the THM estimates fall within 10% of an average of boreholes samples. Areas falling outside are typically poorly drilled and most likely the resources are of lower category. The model is also broken down into smaller areas, blocks and domains to compare the block values against the input data.

Figure 10: Comparison of Bore hole THM grade with Block model THM grade estimates; Northing FBA

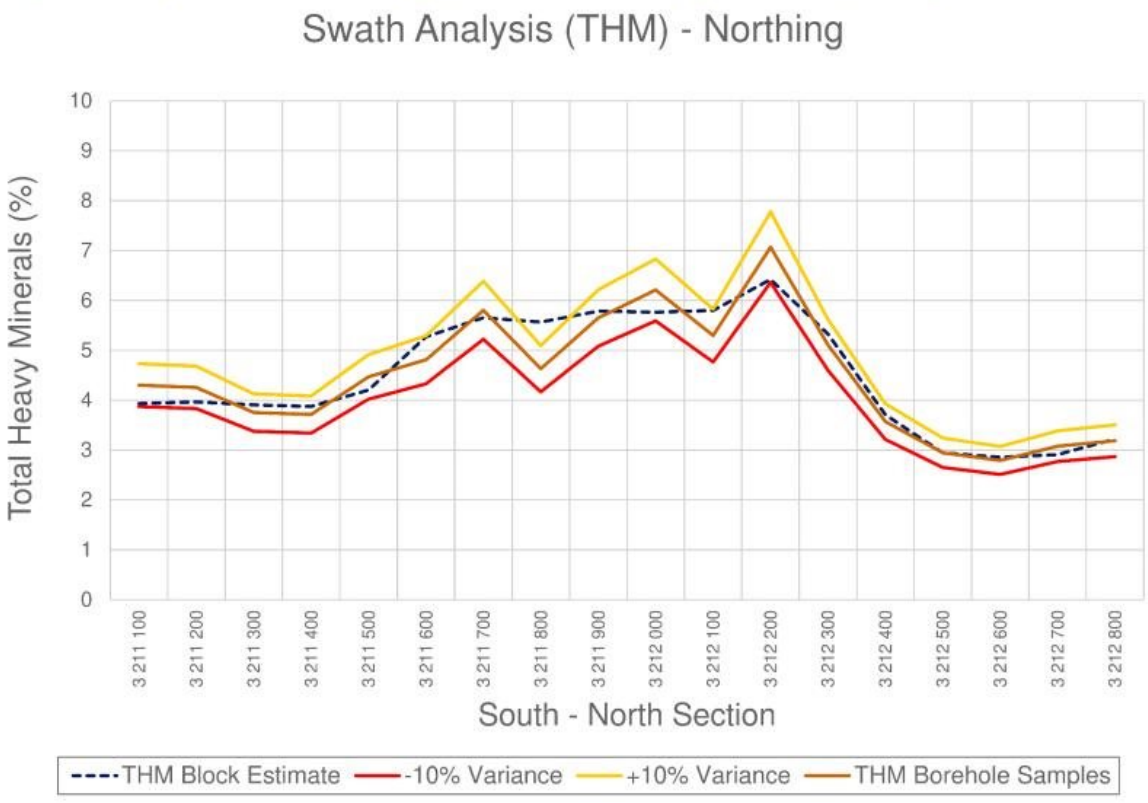
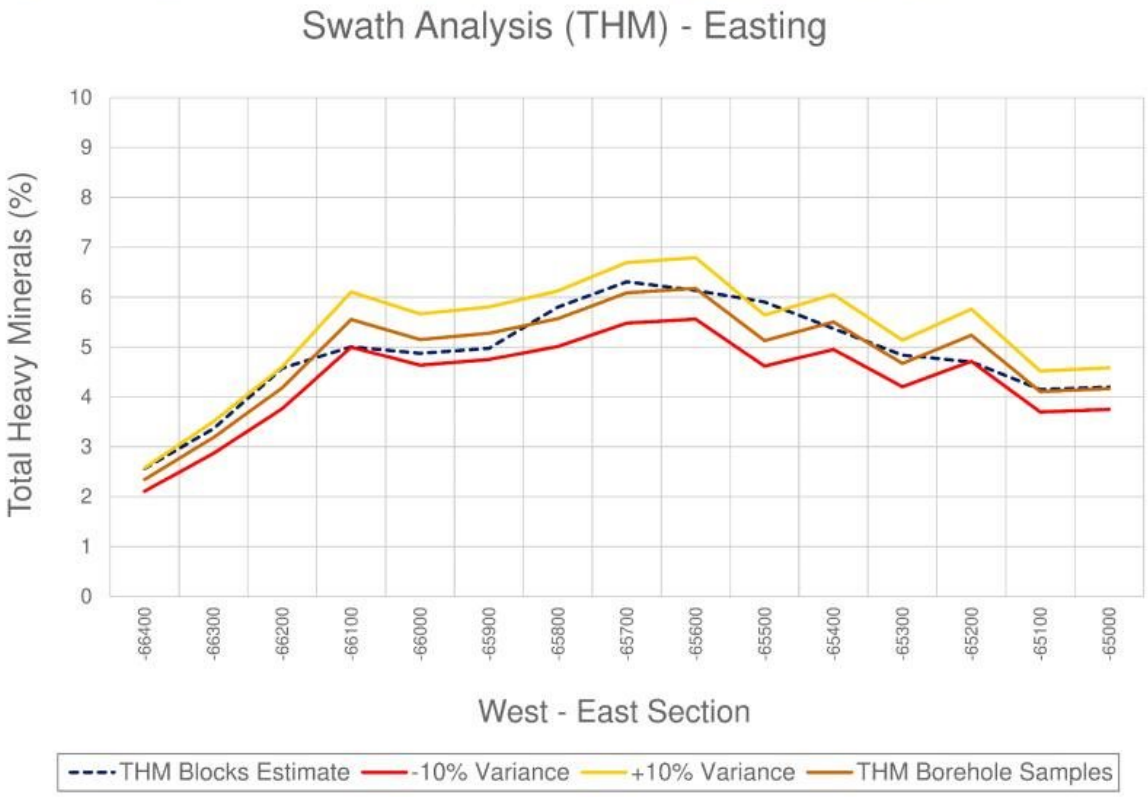


Figure 11: Comparison of Bore hole THM grade with Block model THM grade estimates; Easting FBA

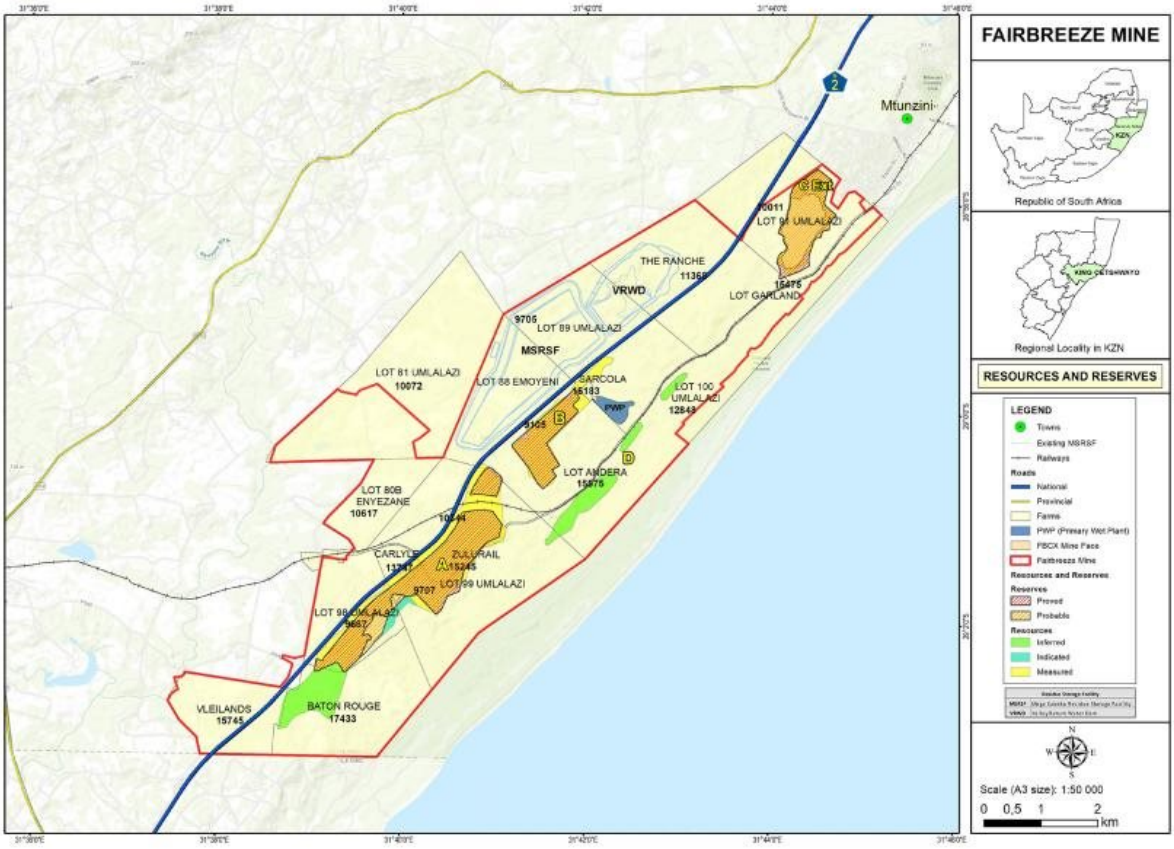


Mineral Resources Classification

Variography for KZN dune deposits has shown that in general, a measured mineral resource is achieved at a drilling density of 100m x 100m. However, final classification considers: drilling density, analytical techniques, and confidence expressed in estimation. Fairbreeze CX and Fairbreeze B have been drilled on a 50m × 50m grid largely to gather detailed information that is pertinent for mine planning. Fairbreeze A has been drilled on 100m x 100m grid, and larger part of the mineral resources are in the measured mineral resource category.

Figure 12 on the next page outlines the physical location of the resources in relation to the reserves.

Figure 12: Mineral reserves and mineral resource Locations



Tronox uses economic contribution as a guide to cut-off determination. This allows for the polymetallic nature of the resource and the broad mineralization of surrounding areas. As costs change over time and long-term revenue values change, new reviews are conducted which may lead to a different grade shell becoming optimal.

The 2021 Mineral Resources Statement for Fairbreeze is presented in Table 4 below.

Table 4: Fairbreeze Summary of Mineral Resources at the End of the Fiscal Year Ended 2021

Exclusive Mineral Resources – Fairbreeze 2021					
Mineral Resources Category	**Material Tonnes Mt**	**THM Grade (%)**	**Mineral Assemblage**		
			Ilmenite Grade (%)	**Rutile + Leucoxene Grade (%)**	**Zircon Grade (%)**
Measured	50	4.1	64.1	8.1	7.7
Indicated	1	2.0	53.5	7.0	7.5
Measured + Indicated	51	4.0	63.9	8.1	7.7
Inferred	56	3.4	54.7	6.9	7.1
TOTAL	**107**	**3.7**	**59.1**	**7.5**	**7.4**

(1) Cut-off grade applied is 1.5% ilmenite

(2) Mineral Resources are exclusive of Mineral Reserves

The categorisation of resources is made based on the judgements of the Qualified Person, in consultation with the mining development engineer and resource geologist.

13 Mining Methods

The mining method at Fairbreeze is hydraulic monitoring. A jet of high-pressure water (+/-2500kpa) is aimed at a mining face, thereby cutting into and loosening the in-situ sand so that it collapses on to the pit floor. The water also acts as a carrier medium for the sand (ROM), buoyed by the clay fines content of the ROM. The slurry generated by the monitors, flows to a collection sump and is then pumped some kilometres to the PWP through a system of booster pumps. The varying grade and clay content requires the mining of different faces concurrently to manage variation.

The pressure and volumetric flow rate at the monitors is controlled through the number of pumps running at the booster pump station, the number of monitors operating and the sizes of the nozzles on these monitors. A monitor is moved towards the mining face once per day. The two ROM pumpstations (sumps), are equipped with 12/10 Warman pumps and 350kW motors. Each pump station also has a monitor that cleans the roots and rocks (oversize) that build up at the pump station screen. Two pump stations are operated at a time. Each pump station has four monitor guns with one of the four on standby.

The mining staff compliment comprises of two sections, the day team and the shift team. The shift team is subdivided into four rotational teams. The mining operation works on a 24hour day basis.

The day team does the daily monitor gun moves, new pump station installations and any pipeline moves. The day crew also manages the stripping and hauling of topsoil.

Ore dilution can occur due to pit floor conditions but is only generally a few % of total tonnage mined and usually contains lower grade mineral sitting in the resource category. The declared resources generally abut the mine plan ore and so minor improvements in operating cost and mineral revenues could see those resources being exploited. There would be little equipment relocation cost required to extract them.

The mining operation is currently active in Fairbreeze CX. Fairbreeze C has been depleted.

The backfilling operation entails placing of the sand tails fraction into the mining void and for the building of residue facility storage walls. The volume of backfilling is a function of the overall sand balance and the amount that is required to provide a suitable post mining topography such that surface run-off water moves to the same water paths as existed prior to mining.

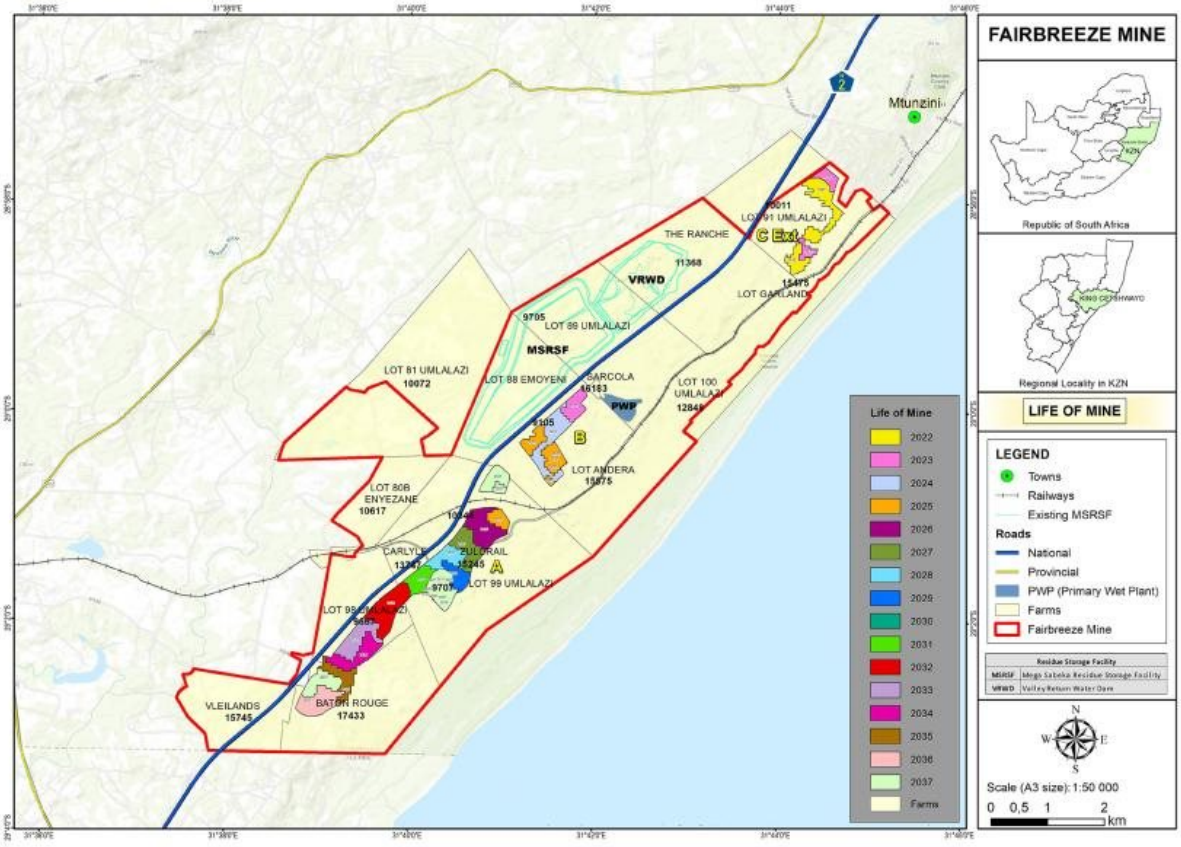
The major strength of the hydraulic mining method lies in the relatively low cost capital layout. The blending capability and throughput control as well as relatively low operating cost. A relatively unskilled workforce can operate the mining equipment.

Figure 13 below shows typical mining operation at Fairbreeze Mine.

Figure 13: Hydraulic mining operation at Fairbreeze Cx

The life of mine plan is shown in Figure 14. The last 2 years of the LOMP consist of material currently in the Inferred Resource category but for which mineral grades encountered are well above cut-off and are sufficiently encouraging and likely to be upgraded following further drilling. The Residue Storage and water return facilities are shown on the West side of the N2.

Figure 14: Life of Mine Plan



14 Processing and Recovery Methods

The ore characteristics and hence the primary processing flowsheet for Fairbreeze is essentially the same as was used at Hillendale. Much of the processing equipment was relocated from Hillendale to Fairbreeze for Phase 1 of the project. Two new 42m diameter Outokumpu high-rate thickeners were installed for the first phase due to substandard performance of the thickeners used at the Hillendale mine, with an additional two thickeners required for the second phase expansion associated with mining the lower grades at FBA and FBB.

Phase 2 will mine ore from A and B ore bodies which require upgrades to the upfront desliming circuit, a further upgrade of the clay fines thickening and residue disposal equipment, rougher spiral capacity, increased concentrator building capacity and additional process water pumping capacity.

A series of pilot tests to determine the effect of the feed variables, other than clay fines, on spiral performance showed that the Rougher spirals would achieve optimum metallurgical performance under the following feed conditions:

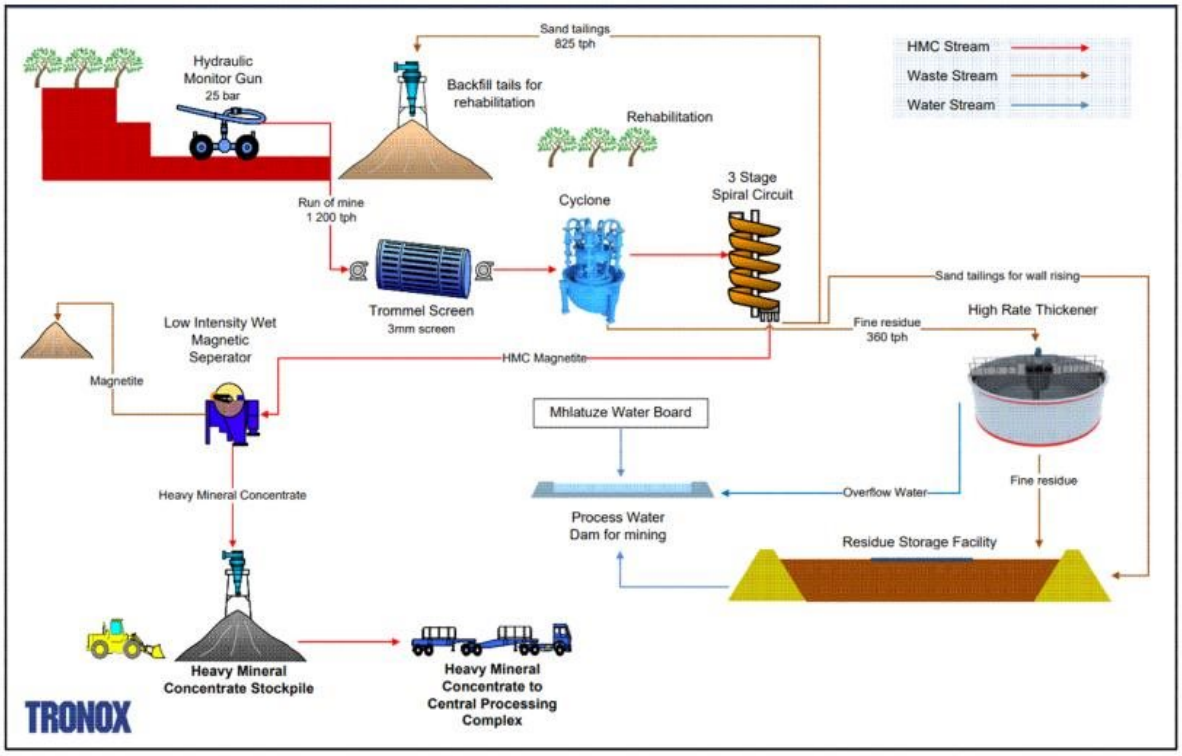
- Solids feed rate per spiral start: 1.8 tph - 2.2 tph
- Slurry density (Solids by mass): 35% - 45%
- Clay fines content < 6.0% as % of feed solids
- Feed grade (THM): 5% - 20%
- Feed mineralogy (Ilmenite:THM): > 0.5

A 9 500 tonne bulk test of Fairbreeze ore through the Hillendale plant confirmed the need for upfront desliming cyclones.

The PWP consists of the following sections and shown in the Figure 15 below:

- Feed preparation and desliming circuits equipped with Multotec de-sliming cyclones.
- Spiral circuit 720 Roughers, 360 middling scavengers (MG4B and MG4 Mineral technology units respectively) and 216 cleaner spiral starts (HG10 Mineral Technology units).
- HMC cleaning circuit: Low Intensity Magnetic Seperator (LIMS)
- Fines thickening and water recovery circuit
  - 2× 42m diameter Outotec high rate thickeners
  - 3× WIRTH positive displacement pumps
- Coarse tailings circuit for backfilling and RSF wall building

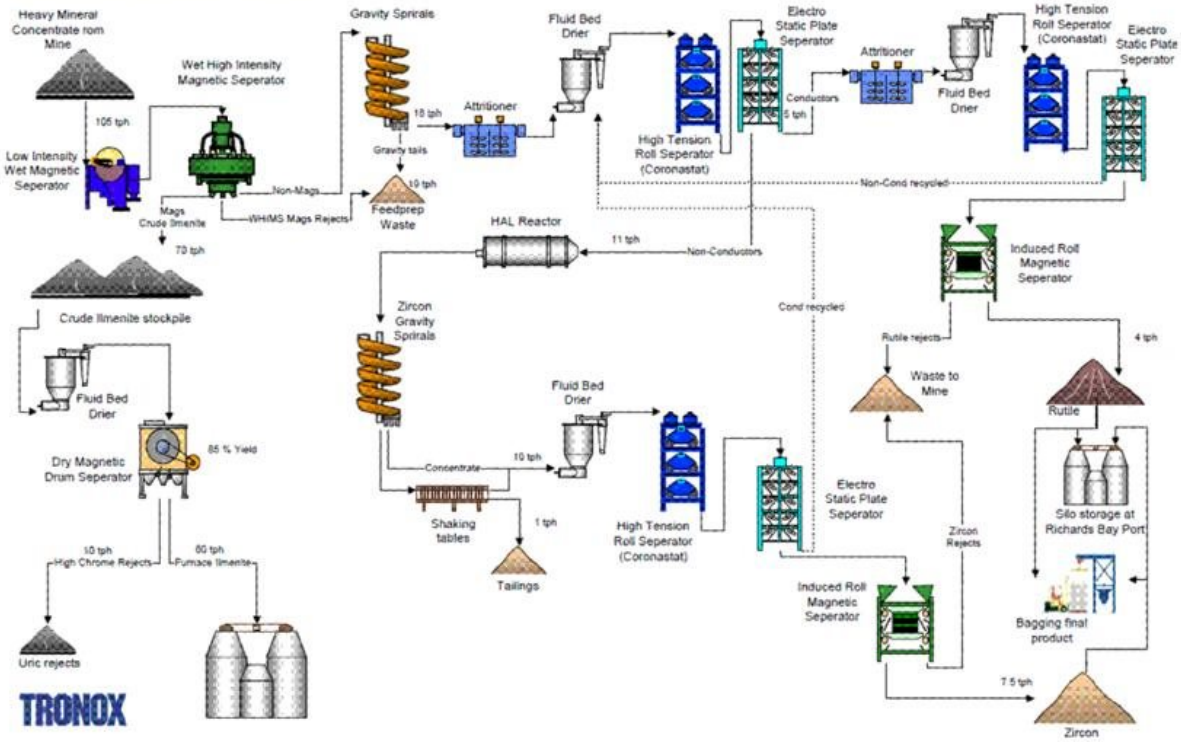
Figure 15: General Flowsheet of Fairbreeze PWP



The Mineral Separation Plant (MSP) used to convert HMC into saleable mineral products is the same that was used for the KZN project's original mining at Hillendale. The mined out Hillendale deposits and the yet to be developed Port Durnford deposits are all in close proximity and all stem from the Berea Type Red Sands. They have similar mineralogy, particle size, clay type and mineral assemblages. Processing characteristics are also similar.

The MSP at Empangeni consists of configurations of relatively standard equipment positioned in the flowsheet to reflect the valuable mineral separation characteristics as well as the processing characteristics of the trash minerals that must be removed in order to recover key products of ilmenite, rutile/leucoxene and zircon at the required quality. The MSP circuit is shown in Figure 16 where the processing blocks contain several or more unit operations within each.

Figure 16: MSP Circuit Flowsheet



The MSP primarily separates the magnetic and electrically conductive ilmenite from the non-magnetic and conductive rutile and leucoxene and also separating rutile and leucoxene from the non-magnetic and non-electrically conductive zircon. The circuitry is also required to remove residual free silica, other silicate minerals, chromite, magnetite and haematite as well as iron stainings and coatings on the minerals which would interfere with efficient mineral separation and quality, particularly for the valuable zircon products.

The ilmenite is primarily recovered in the feed prep and Uric circuits where all HMC is subject to various levels of magnetic intensity, both wet and dry to remove chromite, magnetite and haematite to make smelter grade ilmenite product.

The primary dry circuit uses electrical conductivity to roughly sort conductive rutiles and leucoxenes from non-conductive zircons. The crude zircon is reacted with sulphuric acid in the hot acid leach (HAL) in order to remove ferrous stainings so that efficient downstream separation in the wet and dry zircon circuits can occur and customer product qualities achieved.

The rutile attritioning circuit removes surface staining from the minerals allowing the redirection of misplaced zircons back to the zircon circuit, and a high TiO_2 rutile product to be finished in the rutile dry circuit.

The chemical quality of the mineral products are shown below in Table 6.

Rutile and zircon products are packed in bulk bags as well as in bulk shipping containers and occasionally stockpiled for bulk in ship holds.

Table 6: Typical Chemical Analysis of Mineral Products

Element	Ilmenite smelter feed (%)	Prime Zircon product (%)	Rutile blend product (%)
TiO_2	47.3	0.13	93.7
Total Fe as Fe_2O_3	52.7	0.06	0.92
ZrO_2	0.19	66.4	0.98
SiO_2	0.70	32.5	2.12
Cr_2O_3	0.19	-	0.11
Al_2O_3	0.36	0.15	0.46
P_2O_5	0.04	0.10	0.02
MnO	1.10	-	-
CaO	0.02	-	0.02
MgO	0.50	-	0.01
V_2O_5	0.25	-	0.44
Nb_2O_5	0.07	-	0.22
U+Th (ppm)	50	490	76
d_{50} (microns)	130	130	140

15 Infrastructure

General

Access to the PWP is from off ramps at Bridge 4 on the national highway N2, south of the town of Mtunzini.

Road transport for HMC to the MSP at Empangeni, a distance of 50km, is along the N2 highway utilizing side tipping trucks. Gypsum waste and MSP sand tailings are returned on the backhaul. There is another route between Fairbreeze and the MSP along the R102 that can be used in emergencies. The distance is similar but the road condition poorer than the newer multi-lane national highway.

Bulk Electricity supply for Fairbreeze is from 88kV and 132kV ESCOM power lines that run adjacent to the residue storage facilities and feeds the Fairbreeze substation. The 132kV line is used to inject into the 88 kV line to ensure there is sufficient power when the Fairbreeze Phase 2 expansion comes online.

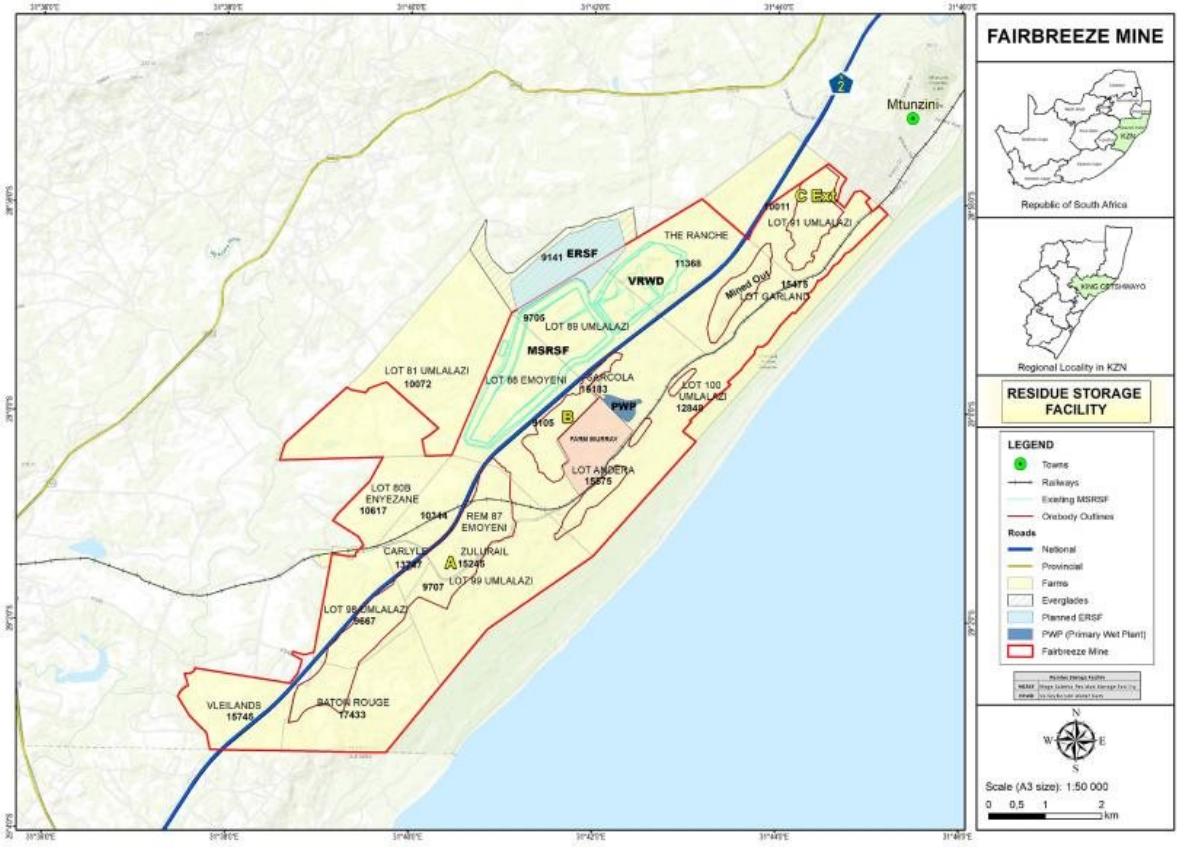
The maximum absorbed power requirements for Fairbreeze are shown below in Table 7.

Table 7: Fairbreeze Maximum Load Requirements

Area	kW requirement (Phase 1)	kW requirement (Phase 2)
Primary Wet Plant	9,500	15,000
Mining	3,600	7,000
Bulk water supply Study 2020	250	1,000

Clay residue facilities are currently in place and operational, however with the recent increase in Reserves, mine life and planned mining rate, an adjacent area called the Everglades RSF will be constructed. This had been considered as a possibility in the original Fairbreeze BFS and capital has been allowed for in the Fairbreeze Phase 2 expansion feasibility study. The Everglades residue storage facility abuts the current MegaSebeka residue facility. Figure 17 shows mining and processing operations on the East side of the N2 whilst the residue storage and water return facilities are located on the West side.

Figure 17: Mining and Processing Facilities with the planned Everglades Residue Facility



Water supply

Water is sourced from the uMhlatuze River upgraded installation that originally supplied the Hillendale mine. This system was upgraded to a pipeline of 750mm nominal diameter over approximately 33km to FB and discharging into the raw water dam.

Site layout infrastructure is shown in the Figure 18 below. Storm water containment, stockpiles, administration buildings and roads along with the wet plant and thickeners can be seen.

Very little permanent infrastructure is required for the actual mining activities.

The population of the Greater Richards Bay area/ The City of Umhlathuze, is approximately 400 000. The workforce is drawn from these surrounding localities in consideration of community and BEEE principles. All employees source their own living facilities.

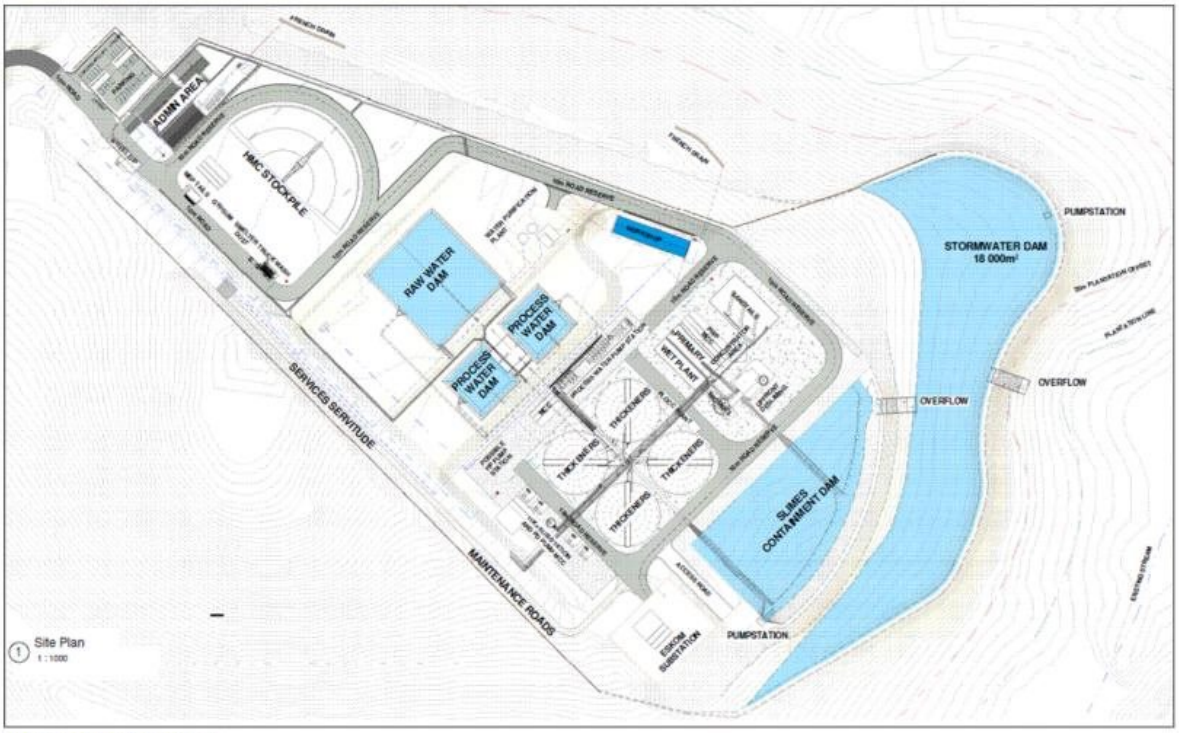
Rail and Shipping

Railway networks in and around the region are suitable for the cargo requirements of the harbour and local industry and are directly connected to the national network for import/export purposes. The harbour at Richards Bay operates a very large coal-handling terminal and controls a wide range of import and export cargos.

Durban also has port facilities that Tronox uses to export containerized and bagged product from.

Air flights can be accessed from Durban King Shaka Airport or Richards Bay Airport.

Figure 18: Layout of the Primary Wet Plant Area



16 Market Studies

The principal commodities titanium and zircon are freely traded, at prices and terms that are widely known, so that prospects for sale of any mineral production are virtually assured.

Tronox is a significant global producer of TiO_2 based pigments and has the specific strategy of being predominantly vertically integrated. This means that its own mining production will provide the bulk of the titanium feedstock to its 9 pigment plants, located around the globe. Tronox Management Pty Ltd now markets all mineral products sold emanating from the Fairbreeze Mine. However, with the integrated pigment strategy, this predominantly relates to the range of zircon products. The KZN zircon products are highly sought for use in tile ceramics and refractories.

Tronox routinely uses the services of various industry trade consultants to closely monitor and report on global production of titanium minerals and zircon as well as reporting on the current global supply and demand status, plus projections of new projects to come on stream, both timing and capacity. Export and import data by country is monitored. As noted earlier, zircon, TiO_2 feedstock and TiO_2 product pricing are internationally traded, specialized commodities. Generally speaking, the prices of our products are substantially in line with the prices for each of these products published quarterly by independent consulting companies who track the mineral sands, titanium dioxide and coatings industries.

The ilmenite product is of smelter grade and processes well in the Empangeni arc furnaces. Natural Rutile has been marketed in the past with a TiO_2 content of 95+% but is currently recovered with leucoxenes and consumed internally by Tronox.

The bulk of KZN zircon is classified as Prime Grade and consistently sells in line with market pricing.

17 Environmental studies, permitting and plans, negotiations, or agreements with local individuals or groups

All necessary authorisations, licences, rights, and permits were obtained for Fairbreeze Phase 1 prior to the commencement of mining in 2015/2016 (see Table 8). For the Phase 2 expansion additional applications have been made, mainly to authorise the new Everglades RSF extension. Application for an integrated environmental authorisation has also been lodged with DMRE. This application is for environmental authorisation in terms of the national environmental management act (NEMA) as well as for authorisation under the national environment management waste act (NEMWA).

The overarching mitigation objectives remain the same as for the mine original EIA, namely:

- To rehabilitate the mine site to the extent where the previous land use is not compromised in terms of value unlocked;
- To minimise any residual environmental impacts resulting from the mining operations; and
- To minimise the social impacts following mine closure.

Due to the 170 ha Everglades RSF facility containing wastes with the potential to pollute and due to it impacting on wetlands, several sections of the National Water Act are also triggered requiring application for a further water use licence, which has been lodged with the applicable departments. (see Table 9). Additionally, the property earmarked for the Everglades RSF needs to be rezoned and an application to the local municipality has been made in terms of the relevant land use planning legislation. Tronox intends to reduce the impact of Fairbreeze Mine on wetlands by relocating the Phase 2 expansion of the existing Mega Sabeka Residue Storage Facility (MSRSF) from the current approved expansion footprint to a proposed new footprint on the adjacent Everglades sugar cane farm. The project will minimise future destruction of wetlands and is anticipated to significantly reduce the environmental impacts associated with the approved Phase 2 expansion.

The Final Basic Assessment Report and Environmental Management Programme conducted by an independent consultant concluded that based on various specialist studies, the project is beneficial. These studies assisted in the assessment of impacts and identification of essential measures that will mitigate the impacts to within tolerable limits. In conclusion the consultant was of the opinion that on purely environmental grounds the application as it is currently articulated, should be approved.

Table 8: Licenses and Permits

Legislation	Permit No.	Date of Issue	Period of Validity (where applicable)	Supporting Studies	Geographical Area
Mineral & Petroleum Development Act	KZN30/5/1/2/2/164 MR	9 Apr 2009	8 Apr 2039		C EXT
	KZN30/5/1/2/2/123 MR	23 Mar 2010	24 Mar 2035		A, B, C & D
Environmental Conservation Act	EIA/4187	19 July 2006	Commence within 7 years Complete within 10 years of commencement		C EXT
National Environmental Management Act	EIA/4187/AMND/2013	2 Sept 2013			C EXT
	DC/28/0033/2013	12 Dec 2014	Commence within 5 years of issue date		CX (Siyayi R Bridge & Offset restoration)
	DC/28/0036/2010	12 July 2012	Commence within 5 years of issue date	Soil and Land Use Socio-economic Social Biodiversity Geohydrology Surface water Biomonitoring Air Quality Noise Heritage Visual	A, B, C & D
	DC/28/0036/2010 Appeal Decisions	11 June 2013		EA upheld	A, B, C & D
National Water Act	06/W13B/CGI/2229	9 Sept 2013			A, B, C & D
	21169147	23 July 2007			A, B, C & D
	06/ W13B/CI/2603	22 July 2014	20 years from date of issue, subject to 5 yearly review		Bulk water pipeline
Kwa-Zulu Natal Heritage Act	0011/10	11 Oct 2011	30 June 2014	Heritage Assessment	A, B, C & D
NEM:BA					

Legislation	Application Ref	Date Submitted	Supporting Studies	Geographical Area
National Environmental Management Act	KZN 30/5/1/2/2/123 MR KZN 30/5/1/2/2/164 MR	2019	Wetlands Terrestrial Habitat Rivers & Estuaries Surface Water Ground Water Dust Noise Visual Heritage Socio-economic Agricultural Traffic & Transport Geotechnical	Everglades RSF Greater Fairbreeze Biodiversity Offset
NEM: Waste Act	KZN 30/5/1/2/2/123 MR KZN 30/5/1/2/2/164 MR	2019		Everglades RSF Greater Fairbreeze Biodiversity Offset
National Water Act		2019		Everglades RSF Greater Fairbreeze Biodiversity Offset
MPRDA	Section 102 Amendment Application	2019		Everglades RSF
SPLUMA	Land Use planning	2021	EIA studies as required. Motivational report by registered town Planning professional	Everglades RSF

Compliance with the approved environmental management programme is monitored monthly by an independent environmental control officer and reported to the DMRE. Compliance with water use licence conditions is audited annually by an independent auditor and reported to Department of Water and Sanitation. The water use licence requires 6 monthly updates for water quality monitoring as well as the audit reports to be submitted by Tronox to the authority.

Formal agreements are in place with Mondi, the owner of orebody A, for compensation of lost earnings and infrastructure due to use of its land for mining. The agreement caters for different forms of compensation. Direct compensation for timber removal is allowed for, compensation for the 6-year period any area is out of forestry production, as well as for impacted infrastructure.

The Fairbreeze B, C and C Ext orebody surface rights are owned by Tronox.

In agreement with NEMA GNR 1147, mine closure provision has been estimated on the basis of functional domains and risks. Rehabilitation of mined out areas are planned to be carried out continuously through the life of mine. In the event of unscheduled closure a provision of US$12M inclusive of contingency, preliminary and general, post closure as well as risk based and regulatory costs, have been allowed for.

Community

The local procurement targets as set out in the Mining Charter for capital goods and procurement of services are being met.

For employment, the proportion of historically disadvantaged South Africans (HDSA) well exceeded the required Mining Charter target levels of 40%.

18 Capital and Operating Cost

As the operation commenced in 2015 the project capital is no longer a relevant factor in determining the economic viability of the property. However, the economic analysis allows for ongoing minor stay in business capital and also an expansion costing in the feasibility estimate range of US$100 to US$135 million for the Fairbreeze Phase 2 throughput expansion project. The expansion will be done in 2 parts with the first entailing additional processing capacity in the wet concentrator along with additional thickening and residue storage capacity. There will be minor additional capital required for the mining of FBA when a dozer trap will come into use. The first stage is expected to be operational by 2024 with the second stage implemented in H2 of 2025

The operating costs are known and no longer subject to estimate. Costs used in the economic analysis come from Tronox internal cost accounting systems.

19 Economic Analysis

For the financial modelling that supports the current Reserves, a range of mining block schedules are prepared by the senior mine development engineer. These schedules contain information on ore tonnes and grades, mineral assemblages, predicted product qualities, clay fines levels as well as other information that may impact on throughputs, recoveries and costs.

There are many mineral sands mines operating worldwide. Many as standalone mineral sales operations producing mineral products similar to those emanating from KZN. With so many operations selling titanium and zircon mineral products on the open market Tronox chooses to value its ore reserves on the basis of what it would have to pay to buy the mineral products, if it didn't produce and use them itself. Mineral pricing data is readily available through a number of industry sources.

The current Fairbreeze orebody is expected to be depleted by 2037 at which time the Operation may possibly be relocated to the nearby Port Durnford deposits following further definition of that resource.

Key cost assumptions, macro and mineral price assumptions:

To determine the economic viability and cash flows of the Fairbreeze project, the Company utilized management's best estimates of the following key assumptions for the mining operations: 1) top soil removal and supportive mechanical mining equipment cost, 2) Hydraulic mining costs, 3) plant variable cost, 4) concentrator fixed costs, 5) tailings fixed costs, and 6) maintenance, overhead and support services costs; and for the separation plant, the assumptions are as follows: 1) plant variable costs, 2) MSP fixed costs, 3) HMC haulage rates and 4) maintenance, overhead and support services. Other key assumptions were mineral royalties, distribution costs, mine and concentrator and MSP capital spending, tax rates, and exchange rates. Cash flows are positive for all years in the Life of Mine Plan out to 2037.

The physical mining and processing parameters used in the life of mine plan result in a mine life of 15 years and product yields from in ground mineral to saleable products as follows:

- Ilmenite 76%
- Rutile 75%
- Zircon 80%

Sensitivity analyses were conducted using variants such as commodity price, operating costs, capital costs, ore grade and exchange rates. As a result of these analyses, the project was determined to be economically viable in all scenarios.

After tax nominal cashflows in current day dollar terms are positive for all years in the Life of Mine Plan.

The financial evaluation of ore reserves at KZN Sands indicates that the ore can be economically extracted and processed based on the current price assumptions, costs and plant performance and expected mineral characteristics.

20 Adjacent Properties

Not applicable.

21 Other Relevant Data and Information

Glossary of Terms are summarized in the table below.

Table 10: Glossary of Terms

Term	Definition
AC	Air Core drilling
Clay Fines	Industry term defined in Tronox as material passing a 45/63 µm sieve and generically meaning "clay and silt suspended in water". For KZN Sands it is 45 µm
CPI	Consumer Price Index, a measure of inflation
DFS	Definitive Feasibility study
DMRE	Department of Mineral Resources and Energy
DTM	Digital Terrain Model
DWER	Department of Water and Environmental Regulation
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
FOB	Free-On-Board pricing
GPS	Global Positioning System
HMC	Heavy Mineral Concentrate
HM/THM	Heavy Minerals/ Total Heavy Minerals
HT Roll	A high voltage electric charging mineral separator
JORC Code	Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves
Kt	Kilo tonnes
LOMP	Life of Mine Plan
Mt	Million tonnes
MWh	Mega Watt Hour, a unit of electricity consumption
Neighbourhood Analysis	Method of classifying multivariate data according to a given distance, provides optimal parameters for modelling.
NYSE	New York Stock Exchange
Ordinary Kriging	A statistical method of relating data points based on distance of separation
QA/QC	Quality Assurance/Quality Control
QEMSCAN	Quantitative. Evaluation of Materials by Scanning. Electron Microscopy
SAMREC	South African Code for the Reporting of Exploration Results, Resources and Mineral Reserves
Strandline	Line of concentrated heavy minerals usually associated with historical shorelines
VHM	Valuable Heavy Minerals (total of Ilmenite+Rutile+Leucoxene+Zircon)
XRF	X-ray fluorescent Analysis
Yield	The recovered weight of material to a saleable product

22 Interpretation and Conclusions

The declaration that as at 31st December 2021, the Fairbreeze operations have 217Mt of Mineral Reserves at 5.5% THM grade and in addition Mineral Resources of 107Mt at 3.7% THM grade is well supported.

The mineralization in the deposit varies relatively gently in lateral dimensions. Material outside the mine plan is usually mineralized, as is the topsoil, and only marginally below planned grade.

The minerals in the deposit are relatively clean with limited existence of inclusions and composite grains. Although there is modest iron staining of the zircon which responds well to HAL treatment and justifies the good recoveries observed in processing.

The product qualities are excellent with the ilmenite being ideally suited for TiO_2 slag production, the rutile product suited to direct use in chloride pigment processes that Tronox predominantly operates, and the zircon well regarded in the market.

Tronox KZN Mineral Sands has a good record for rehabilitation of past mining areas, groundwater management, control of dust and radiation management. Relationships with key stakeholders and government regulators are also in good standing. The LOMP expects to operate through to 2037 with financial provisions made for both scheduled closure and an unexpected closure.

On a minerals only basis, financial modelling shows that future reserves are profitably mineable with the existing equipment and infrastructure or as deemed appropriate in the Phase 2 feasibility study.

The Fairbreeze operations are a key part of the Tronox vertically integrated pigment production process.

23 Recommendations

That geological work continues to better define the economic margins of the resources, looking for inclusion, at least in part, as reserves to further extend mine life.

24 References

List of References summarized in the table below.

Table 11: List of References

Title
Everglades RSF Pre-Feasibility Study
Fairbreeze A&B Definitive Feasibility Study 2020
Fairbreeze Bankable Feasibility Study Updated 2014
Final Basic Assessment Report and Environmental Management Programme - Proposed Everglades Expansion of the Residue Storage Facility and the iSiyaya Plantations Biodiversity Offset at Fairbreeze Mine - Feb 2021
KZN Sands Mineral Resources and Mineral Reserves Report 2021
Tronox KZN Mineral Sands Mine Closure Plan

25 Reliance on information provided by the registrant

The preparation of this Technical Summary Report relies on information provided by Tronox and its employees in the following areas, as they are reasonably outside the expertise of the qualified persons.

- Marketing plans and pricing forecasts as key inputs to the economic modelling;
- Environmental performance commitments and mine closure costing;
- Maintenance of licenses and other government approvals required to sustain the LOMP;
- Capital to progress the mining of the Fairbreeze A and B deposits.

26 Date and Signature Page

This report titled “KZN Technical Report Summary” with an effective date of December 31, 2021 was prepared and signed by:

/s/ Carlo Philander

Carlo Philander, Regional Manager Mineral Resource Development
Dated at Koekenaap, Western Cape, South Africa
February 22, 2022