

Rio Tinto releases third quarter production results

17 October 2023

Rio Tinto Chief Executive Jakob Stausholm said: “We delivered another quarter of progress and maintained momentum at our Pilbara iron ore operations. We continued to make good headway ramping up our Oyu Tolgoi high-grade underground copper mine, our Kitimat aluminium smelter returned to full production, and we safely restarted the smelter and refinery at Kennecott after completing the largest rebuild in its history. We have more to do as we work towards sustainable performance improvements across our business.

“We took real steps to build our portfolio of materials needed for the future, signing agreements that will see us take a leading position in recycled aluminium in North America and agreeing to enter a joint venture with Codelco to explore for copper in Chile. We also completed further infrastructure agreements with our partners for the world class Simandou iron ore project.

“We are making strong progress towards building the Rio Tinto of the future, striking a balance between disciplined performance in evolving market conditions, investing to generate valuable long-term growth and delivering attractive shareholder returns.”

Production*		Q3 2023	vs Q3 2022	vs Q2 2023	9 MTHS 2023	vs 9 MTHS 2022
Pilbara iron ore shipments (100% basis)	Mt	83.9	+1%	+6%	245.5	+5%
Pilbara iron ore production (100% basis)	Mt	83.5	-1%	+3%	244.0	+4%
Bauxite	Mt	13.9	+2%	+3%	39.5	-5%
Aluminium	kt	828	+9%	+2%	2,427	+9%
Mined copper (consolidated basis)	kt	169	+5%	+17%	460	+1%
Titanium dioxide slag	kt	247	-20%	-19%	835	-5%
IOC** iron ore pellets and concentrate	Mt	2.4	-14%	+16%	7.0	-10%

*Rio Tinto share unless otherwise stated

**Iron Ore Company of Canada

Q3 2023 operational highlights and other key announcements

- Our all-injury frequency rate of 0.36 improved from the third quarter of 2022 (0.39), and was in line with the prior quarter (0.36). We continue to learn from process safety reviews completed in the third quarter following previously reported incidents at our Rio Tinto Iron and Titanium (RTIT) Sorel-Tracy complex and Kennecott, and are planning to further enhance safety at these operations.
- Pilbara operations produced 83.5 million tonnes (100% basis) in the third quarter, 1% lower than the corresponding period of 2022. Shipments were 83.9 million tonnes (100% basis), 1% higher than the corresponding period of 2022. We continue to expect full year shipments in the upper half of the original 320 to 335 million tonne range.
- In early October, we hosted a site tour of our Pilbara operations for investors and analysts. Presentation materials for this visit are available on our [website](#).
- Bauxite production of 13.9 million tonnes was 2% higher than the third quarter of 2022 as we achieved the initial benefits of stabilising our operations, particularly at Weipa where equipment reliability and performance improved.
- Aluminium production of 0.8 million tonnes was 9% higher than the third quarter of 2022 as we returned to full capacity at our Kitimat smelter and completed cell recovery efforts at our Boyne smelter. All our other smelters continued to demonstrate stable performance during the quarter.
- On 21 July, we [announced](#) we had entered into an agreement with Giampaolo Group, one of North America's largest fully-integrated metal management businesses, to form a joint venture to manufacture and market recycled aluminium products. Under the terms of the agreement, Rio Tinto will acquire a 50% equity stake in Giampaolo Group's wholly-owned Matalco business for \$700 million subject to usual closing adjustments. Matalco operates six facilities in the United States and one in Canada, with the capacity to produce approximately 900,000 tonnes of recycled aluminium per annum. Receipt of customary regulatory approvals for the transaction is progressing well, with completion now expected around the end of 2023 (previously first half of 2024).

- Mined copper production of 169 thousand tonnes (on a consolidated basis), was 5% higher than the third quarter of 2022 as we benefited from the continued ramp-up of the high grade underground mine at Oyu Tolgoi and higher copper feed grades at Escondida. These benefits were partially offset by lower production at Kennecott, as the concentrator returned to full capacity during the period, recovering from the conveyor failure which occurred in March 2023.
- Refined copper production of 34 thousand tonnes, was 37% lower than the third quarter of 2022 as we completed the largest rebuild of the smelter and refinery in Kennecott's history during the quarter. The ~\$300 million rebuild incorporated approximately 300 engineering and maintenance projects, and a workforce of ~3,200. The refinery and smelter were safely restarted during the period, with production expected to ramp up during the fourth quarter. The scope of works included a rebuild of the flash converting furnace, which was restarted late in the third quarter.
- On 11 August, Simfer [concluded](#) key agreements with the Republic of Guinea and Winning Consortium Simandou (WCS) on the trans-Guinean infrastructure for the Simandou project. The Co-Development Convention with the Republic of Guinea and associated agreements create the legal framework for the co-development of more than 600 kilometres of new multi-use rail together with port facilities. During the period, Simfer and WCS also signed an investment agreement in relation to the construction of the Trans-Guinean railway and port infrastructure. Investments into the infrastructure joint venture vehicle remain subject to a number of conditions, including the finalisation and approval of the feasibility study and capital funding requirements for the project by all partners, and regulatory approvals.
- On 1 August, we [announced](#) the agreement to purchase PanAmerican Silver's stake in Agua de la Falda S.A. ("Agua de la Falda"), a company with exploration tenements in Chile's prospective Atacama region, and to enter a joint venture with Corporación Nacional del Cobre de Chile ("Codelco") to explore and potentially develop Agua de la Falda's assets.
- Titanium dioxide slag production of 247 thousand tonnes was 20% lower than the third quarter of 2022. Two furnaces at our RTIT Quebec Operations remain offline following process safety incidents in June and July which we are currently investigating.
- IOC production of 2.4 million tonnes, was 14% lower than the third quarter of 2022 as operations were impacted by extended plant downtime and conveyor belt failures, while we also recovered from wildfires which took place in Northern Quebec in the prior quarter. Given these challenges our full year production guidance has been reduced to 9.3 to 9.8 million tonnes (previously 10.0 to 11.0 million tonnes).
- In the third quarter, we commenced deployment of the Safe Production System at a further two sites, taking the total to 22 sites. The Safe Production System focuses on continuously improving safety, strengthening employee engagement and sustainably lifting operational performance across our global portfolio. While we still have a lot to do to see sustainable improvement, site deployments are rolling out according to plan and we expect to be at the upper end of our range of four to eight new sites in 2023.
- On 9 August, we [announced](#) the signing of a multi-year supply agreement for high grade direct reduction iron ore pellets from IOC's operations with H2 Green Steel, an industrial startup establishing large scale production of green steel.
- On 5 September, we [announced](#) the appointment of Jérôme Péresse to lead our Aluminium business, succeeding Ivan Vella. Jérôme, who was until recently President and CEO of General Electric (GE) Renewable Energy, will join Rio Tinto on 23 October 2023. Jérôme is a French citizen with over 30 years of business experience, including senior leadership roles in global companies in the mining and energy fields.

All figures in this report are unaudited. All currency figures in this report are US dollars, and comments refer to Rio Tinto's share of production, unless otherwise stated.

2023 guidance

Rio Tinto production share, unless otherwise stated	2022 Actuals	2023 Sept. YTD	2023 Previous	2023 Current
Pilbara iron ore (shipments, 100% basis) (Mt)	322	245.5	320 to 335 ¹	Unchanged
Bauxite (Mt)	55	39.5	54 to 57 ²	Unchanged
Alumina (Mt)	7.5	5.6	7.4 to 7.7	Unchanged
Aluminium (Mt)	3.0	2.4	3.1 to 3.3	Unchanged
Mined copper (kt) ³	521	460	590 to 640	Unchanged
Refined copper (kt)	209	129	160 to 190	Unchanged
Diamonds (M carats)	4.7	2.7	3.0 to 3.8	Unchanged
Titanium dioxide slag (Mt)	1.2	0.8	1.1 to 1.4 ²	Unchanged
IOC ⁴ iron ore pellets and concentrate (Mt)	10.3	7.0	10.0 to 11.0	9.3 to 9.8
Boric oxide equivalent (Mt)	0.5	0.4	~0.5	Unchanged

¹In the upper half of the range.

²In the lower end of the range.

³Mined copper for 2023 guidance and actuals includes Oyu Tolgoi on a 100% consolidated basis following Rio Tinto's acquisition of Turquoise Hill Resources Ltd, which completed on 16 December 2022. Mined copper for 2022 includes Oyu Tolgoi on a 33.52% Rio Tinto share basis.

⁴Iron Ore Company of Canada continues to be reported at Rio Tinto share.

- Guidance for 2023 IOC production has been reduced to 9.3 to 9.8 million tonnes (previously 10.0 to 11.0 million tonnes), as operations were impacted by extended plant downtime and conveyor belt failures, while we also recovered from wildfires which took place in Northern Quebec in the prior quarter.
- Pilbara iron ore shipments for 2024 are expected to be 323 to 338 million tonnes. SP10 levels are expected to remain elevated for the next few years as we work through the next tranche of mine replacement projects. Levels are dependent on the timing of approvals for planned mining areas.
- Iron ore shipments and bauxite production guidance remain subject to weather impacts.

Operating costs

- Guidance for 2023 Pilbara iron ore unit cash costs is unchanged at \$21.0 to \$22.5 per tonne, based on A\$:US\$ exchange rate of 0.70.
- Guidance for 2023 Copper C1 unit costs is unchanged 180 to 200 US cents/lb.

Investments, growth and development projects

- Pre-tax and pre-divestment expenditure on exploration and evaluation charged to the profit and loss account in the first nine months of 2023, excluding Simandou, was \$613 million, compared with \$506 million in the first nine months of 2022 on the same basis. Approximately 33% of the spend was by central exploration, 31% by Minerals, 27% by Copper and 8% by Iron Ore.
- Spend on Simandou in the first nine months of 2023 was \$574 million (on a 100%¹ basis), compared to \$87 million in the first nine months of 2022.

Pilbara mine projects

- Construction of our Western Range mine remains on schedule as we advanced primary crusher pad installation, bulk earthworks and mine pre-strip.
- We advanced our next tranche of Pilbara mine replacement project studies including Hope Downs 1 Sustaining (Hope Downs 2 and Bedded Hilltop), Brockman 4 sustaining (Brockman Syncline 1), Greater Nammuldi Sustaining and West Angelas Sustaining. We are working closely with Traditional Owners and Government Regulators on Part IV environmental approvals and heritage clearances.

Oyu Tolgoi underground project

- We continue to see strong performance from the underground mine, with a total of 72 drawbells opened from Panel 0, including 18 drawbells during the quarter. The operation is expected to ramp up to deliver average mined copper production of ~500ktpa (100% basis) between 2028 and 2036².
- Shaft sinking continued during the quarter and at the end of September, shafts 3 and 4 reached 780 metres and 879 metres below ground level, respectively. Updated final depths required for shafts 3 and 4 are 1,134 and 1,176 metres below ground level, respectively. We expect both shafts to be commissioned in the second half of 2024 with shaft sinking rates continuing to meet those required for this timeline.
- Construction of conveyor to surface works continued to plan and are now approaching 75% completion as at the end of September. Construction works for the concentrator conversion also progressed during the period, with the main contractor mobilised and required tie-in works completed during a planned plant shutdown.
- During the quarter, Rio Tinto, Oyu Tolgoi and the Government of Mongolia continued to work together towards the implementation of Mongolian Parliamentary Resolution 103.

Other key projects and exploration and evaluation

- At Complexe Jonquière in Canada, we commenced early works for the \$1.1 billion expansion of the AP60 aluminium smelter with low-carbon technology. The investment will add 96 new AP60 pots, increasing capacity by approximately 160,000 metric tonnes of primary aluminium per year. This new capacity, in addition to 30,000 tonnes of new recycling capacity at Arvida expected to open in the first quarter of 2025, will offset the 170,000 tonnes of capacity lost through the gradual closure of potrooms at the Arvida smelter from 2024.
- On 21 July, we [announced](#) we had entered into an agreement with Giampaolo Group, one of North America's largest fully-integrated metal management businesses, to form a joint venture to manufacture and market recycled aluminium products. Under the terms of the agreement, Rio Tinto will acquire a 50% equity stake in Giampaolo Group's wholly-owned Matalco business for \$700 million subject to usual closing adjustments. Matalco operates six facilities in the United States and one in Canada, with the capacity to produce approximately 900,000 tonnes of recycled aluminium per annum. Receipt of customary regulatory approvals for the transaction is progressing well, with completion now expected around the end of 2023 (previously first half of 2024).
- At Kennecott, we commenced contractor mobilisation and underground activities for the \$498 million investment to deliver development and infrastructure for an area known as the North Rim Skarn³ (NRS). Production from the NRS is expected to commence in 2024 and ramp up over two years, to deliver around 250 thousand tonnes of additional mined copper over the next 10 years⁴ alongside open cut operations.

- At the Resolution Copper project in Arizona, the United States Forest Service (USFS) continued work to progress the Final Environmental Impact Statement (FEIS) and complete actions necessary for the land exchange. We continued to advance partnership discussions with several federally-recognised Native American Tribes who are part of the formal consultation process. We are also monitoring the Apache Stronghold versus USFS case held in the US Ninth Circuit Court of Appeals. While there is significant local support for the project, we respect the views of groups who oppose it and will continue our efforts to address and mitigate these concerns.
- At the Winu copper-gold project in Western Australia, we continued to strengthen our relationships and advanced agreement making over the quarter with host Traditional Owners, the Martu and Nyangumarta groups. Drilling, fieldwork and study activities continued over the period strengthening the development pathway ahead of applications for regulatory and other required approvals.
- At the Simandou iron ore project in Guinea, negotiations continued to progress to enable the co-development of rail and port infrastructure by Simfer, Winning Consortium Simandou (WCS) and the Guinean State. On 11 August, Simfer [concluded](#) key agreements with the Republic of Guinea and WCS on the trans-Guinean infrastructure. The Co-Development Convention with the Republic of Guinea and associated agreements create the legal framework for the co-development of more than 600 kilometres of new multi-use rail together with port facilities. During the period, Simfer and WCS also signed an investment agreement in relation to the construction of the Trans-Guinean railway and port infrastructure. Investments into the infrastructure joint venture vehicle remain subject to a number of conditions, including the finalisation and approval of the feasibility study and capital funding requirements for the project by all partners, and regulatory approvals. We also continued to progress critical path works to ensure progress is maximised during the 2023 dry season, including establishing accommodation camps to support mobilisation on both our mine and rail scope, earthworks and geotechnical drilling at the port.
- On 1 August, we [announced](#) the agreement to purchase PanAmerican Silver's stake in Agua de la Falda, a company with exploration tenements in Chile's prospective Atacama region, and to enter a joint venture with Codelco to explore and potentially develop Agua de la Falda's assets. Under the agreement, Rio Tinto will acquire PanAmerican Silver's 57.74% operating stake in Agua de la Falda for \$45 million and the grant of net smelter returns royalties. Codelco holds the remaining 42.26%.
- On 28 August 2023 we [completed](#) a transaction to form a joint venture that will work to unlock the development of the La Granja project in Peru, one of the largest undeveloped copper deposits in the world. On completion of the transaction, First Quantum acquired a 55% stake in the project for \$105 million and will invest up to a further \$546 million into the joint venture to sole fund capital and operational costs to take the project through a feasibility study and toward development.
- Nuton™, our proprietary copper heap leaching technology, made further progress during the quarter, [announcing](#) an option agreement with Excelsior Mining to further evaluate the use of our copper heap leaching technologies at Excelsior's Johnson Camp mine in Cochise County, Arizona.
- We continue to believe that the Jadar lithium-borate project in Serbia has the potential to be a world-class asset, that will support the development of other future industries in Serbia, acting as a catalyst for tens of thousands of jobs for current and future generations, and sustainably producing materials critical to the energy transition. We are focused on consultation with all stakeholders to explore options related to the project's future.
- At the Rincon lithium project in Argentina, development of the three thousand tonne per annum lithium carbonate starter plant is ongoing. Construction activities progressed, with the airstrip completed during the quarter, while enabling works for the process plant continued. We progressed studies for the full scale operation during the quarter, and the exploration campaign to further understand Rincon's basin, brine and water reservoirs. We continue to engage with communities, the province of Salta and the Government of Argentina to ensure an open and transparent dialogue with stakeholders about the works underway.

¹Costs relating to the Simfer joint venture where the Government of Guinea holds 15% and Simfer Jersey holds 85%. Simfer Jersey is owned by Rio Tinto (53%) and Chalco Iron Ore Holdings (CIOH) (47%).

²The 500kpta copper target (stated as recoverable metal) for the Oyu Tolgoi underground and open pit mines for the years 2028 to 2036 is underpinned 13% by Proved Ore Reserves and 87% by Probable Ore Reserves. This production target has been scheduled from mine designs based on the Oyu Tolgoi Feasibility Study 2020 (OTFS20), which are not materially different to current mine designs, by Competent Persons in accordance with the requirements of the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves, 2012 Edition (the JORC code).

³The NRS Mineral Resources and Ore Reserves, together with the Lower Commercial Skarn (LCS) Mineral Resources and Ore Reserves, form the Underground Skarns Mineral Resources and Ore Reserves. These Mineral Resources and Ore Reserves have been reported in accordance with the JORC Code and the ASX Listing Rules in a release dated 20 June 2023 titled "Rio Tinto Kennecott Mineral Resources and Ore Reserves" (Table 1 Release). The Competent Person responsible for the information in that release that relates to Mineral Resources is Mr Ryan Hayes, a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM). The Competent Person responsible for the information in that release that relates to Ore Reserves is Mr Stephen McInerney, a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM). Rio Tinto confirms that it is not aware of any new information or data that materially affects the information included in the Table 1 Release, that all material assumptions and technical parameters underpinning the estimates in the Table 1 Release continue to apply and have not materially changed, and that the form and context in which the Competent Persons' findings are presented have not been materially modified.

⁴This production target for 2023 to 2033 is underpinned 25% by Probable Ore Reserves, 9% by Indicated Resources, and 66% by Inferred Resources. Mined copper is reported as total recoverable metal. These estimates of Mineral Resources and Ore Reserves were reported in the Table 1 Release which is available on Rio Tinto's website at [resources & reserves \(riotinto.com\)](https://www.riotinto.com/resources-reserves), and have been prepared by Competent Persons in accordance with the requirements of the JORC code and ASX Listing Rules.

Sustainability highlights

We are creating an open and transparent environment which will make positive and lasting change and strengthen our workplace culture for the long term, as we continue to implement the 26 recommendations of the Everyday Respect report. We are building knowledge and capability through training and change programs including providing face to face training in some locations and integrating Everyday Respect concepts into some leader and culture change programmes for 2024. Our inclusive facilities work is ongoing and we also now have 19 village councils implemented with more planned. Work continues to elevate and support the voices of our people and contractors through the commencement of contractor listening sessions, as well as the establishment of additional early career networks and employee resource groups for underrepresented groups within our business. In line with the recommendations of the Everyday Respect report, preparations are also underway for our independent progress review in 2024.

On 4 August, we [disclosed](#) detailed information on 14 of our global tailings facilities and their progress towards conformance with the Global Industry Standard on Tailings Management (GISTM). These tailings facilities are those rated Very High or Extreme under GISTM classifications, based on the highest potential consequences in the extremely unlikely event of a failure.

On 20 September, we [announced](#) Kennecott is reclaiming 740 additional acres of land at the Bingham Canyon Mine as part of the company's commitment to the environment and the local community. The East Waste Rock Reclamation project entered its third phase this summer and is expected to last through 2028. This restoration process enhances biodiversity on the remediated land and improves the appearance of the mine for residents throughout Salt Lake Valley.

Communities & Social Performance (CSP)

In August, as part of our cultural heritage monitoring and management processes we identified the fall of a Pilbara scrub tree and a one cubic metre rock from the overhang of a rock shelter in an area adjacent to the Nammuldi mine site. As soon as we identified this, we paused nearby blasting work which was occurring 150 metres away, and notified the Traditional Owners of the land, the Muntulgura Guruma people. We have apologised to the Muntulgura Guruma people, who we deeply respect, and are continuing to work closely with them. A review into the incident is ongoing and if there are lessons that require us to improve our processes, we will do so.

On 25 July, we [announced](#) a donation of 28.25 acres of land valued at approximately \$165,000 for the expansion of the Southwestern Oregon Community College (SWOCC) Curry Campus. This land donation triples the size of the campus about two miles north of Brookings, Oregon. It adds space to the west and south of the existing 10-acre site, which the company donated to the College in 2010.

On 1 August, we [announced](#) our commitment of \$150 million to create a Centre for Future Materials led by Imperial College London to find innovative ways to provide the materials the world needs for the energy transition. The 'Rio Tinto Centre for Future Materials' will fund research programmes to transform the way vital materials are produced, used and recycled, and make them more environmentally, economically and socially sustainable.

On 18 August, we [announced](#) that to support those who have been impacted by wildfires in Canada's Northwest Territories, Diavik Diamond Mine would be donating CAN\$250,000 to the United Way Northwest Territories (UWNWT) to support with wildfire response efforts.

On 30 August, we [announced](#) a partnership with the Perth Wildcats and Perth Lynx in a new sponsorship that aims to enhance basketball in Western Australia from emerging young talent to the elite level of competition. The partnership will increase access to pathways for Western Australian's who would like to participate in the popular sport and promote women in sport at a professional level.

On 14 September, we [announced](#) IOC will be donating CAN\$4 million over two years to the Cégep de Sept-Îles in Quebec, Canada for the construction of its new pavilion for training, research and innovation in the railway, industrial maintenance and energy intelligence industries.

On 21 September, we [announced](#) international environmental experts, JBS&G Australia Pty Ltd, had completed a comprehensive independent community study of radiation at the Rio Tinto QIT Madagascar Minerals (QMM) mine in Fort Dauphin, Southern Madagascar, which concluded that there is no need for heightened health concerns around local radiation levels. The analysis received on the five cycles covering various seasons from November 2019 to October 2022 showed that local food sources, water, air and dust are safe from a radiological perspective.

Key highlights from the quarter are outlined above, with further information available on our [website](#).

Climate change, product stewardship and our value chain

In the third quarter we continued to focus on innovative solutions that have the potential to be scalable across Rio Tinto's global value chains.

- On 12 July, we [announced](#) in partnership with Sumitomo Corporation that we will build a first-of-a-kind hydrogen plant in Gladstone as part of a A\$111.1 million program aimed at lowering carbon emissions from the alumina refining process. The Yarwun Hydrogen Calcination Pilot Demonstration Program received the green light after a A\$32.1 million co-funding boost from the federal government's Australian Renewable Energy Agency (ARENA). The program is aimed at demonstrating the viability of using hydrogen in the calcination process, where hydrated alumina is heated to temperatures of up to 1,000 degrees Celsius. The trial is expected to produce the equivalent of about 6,000 tonnes of alumina per year while reducing Yarwun's carbon dioxide emissions by about 3,000 tonnes per year.
- On 9 August, we [announced](#) the signing of a multi-year supply agreement for high grade direct reduction iron ore pellets from IOC's operations with H2 Green Steel, an industrial startup establishing large scale production of green steel. Rio Tinto will also purchase and on-sell a part of the surplus low carbon hot briquetted iron (HBI) produced by H2 Green Steel during the ramp-up of its steelmaking capacity.

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Our markets

Commodity prices found some support during the quarter and are closer to levels at the start of the year. China's economic recovery has been uneven, as the property market continues to weigh on the economy and prompts further policy easing. Consumer confidence in the US has started to wane while manufacturing activity in advanced economies decelerated further as recessionary risks remain.

- China's economy is showing signs of stability, with resilient steel demand as growth drivers shifted from property to infrastructure and manufacturing. In response to the weaker property market and slowing export growth, the government has implemented support measures, with mortgage access substantially eased in top-tier cities, down payments lowered across the country and purchase restrictions removed in tier 2 cities.
- The US economy continues to adjust to the effects of tightening monetary policy. The net effect has been a slowing pace of economic activity which may still lead to a recession by year end. A potential government shutdown and the United Auto Workers strike add to the downside risks. Inflation is still set to moderate gradually over the next few years due to weaker housing inflation and a steady moderation in wage growth.
- The eurozone economy continues to be challenged by weak manufacturing activity. Weakness was broad-based across both domestic and external sectors. Even though both core and services inflation fell marginally, they were offset by a large monthly increase in energy prices.
- Iron ore prices rose by 7% during the quarter, lifting the average 62% Fe CFR China price to \$114 per dry tonne, up 3% quarter-on-quarter. China's domestic steel demand is up 1% year-to-date to August 2023 despite continued weakness in residential property, while a 40% spike in net steel exports lifted crude steel production and iron ore imports by 4.5% and 5%, respectively. This, coupled with headwinds to China's domestic iron ore production, led to portside iron ore inventories declining to a three-year low of 114 million tonnes at the end of the quarter, despite the ~8 million tonne quarter-on-quarter increase in seaborne iron ore supply.
- The LME cash aluminium price rose by 10% over the quarter, although the \$2,154/t average price was 5% lower than the second quarter. Smelter restarts in Yunnan were completed, lifting Chinese production, but reported Chinese inventories remained low, due to strong demand driven by solar modules construction. However, aluminium shipments and orders, in the US, Europe and Japan, except for the transport sector, remained weak. Meanwhile, declining raw materials costs eroded cost support for aluminium.
- The copper LME price was slightly weaker in the third quarter, with the average price down 1% quarter-on-quarter to \$3.79/lb. China's demand continued to be resilient; however, ex-China demand has weakened, as high interest rates hit construction activity. New mining projects in South America and Africa have started to deliver volumes. Inventories edged up slightly in the third quarter, but the market remains balanced year-to-date.
- Lithium carbonate spot prices fell by up to 50% (depending on grade) during the third quarter, driven by the slowing electric vehicle (EV) sales growth trajectory and inventory build through the supply chain. Supply from non-traditional regions (Africa) is coming to market, incentivised by two years of elevated prices. Longer term, market fundamentals for lithium remain strong, as EV adoption continues to rise on supportive government policies and supply shortfalls requiring further investment.
- The titanium dioxide feedstock market continues to experience weakness with average prices down approximately 3 to 5% quarter-on-quarter, depending on grade, as Western customers reported soft downstream demand. Feedstock inventory build at the consumer level is also likely to weigh on apparent demand.
- Borates prices came under pressure as weak construction markets impact underlying demand. Boric acid prices in China fell ~10% quarter-on-quarter in the current period.

Iron Ore

Rio Tinto share of production (Million tonnes)	Q3 2023	vs Q3 2022	vs Q2 2023	9 MTHS 2023	vs 9 MTHS 2022
Pilbara Blend and SP10 Lump ¹	21.4	0%	+2%	62.1	+8%
Pilbara Blend and SP10 Fines ¹	31.7	-3%	0%	94.3	+7%
Robe Valley Lump	1.7	+20%	+12%	4.3	+19%
Robe Valley Fines	2.4	+13%	+1%	6.8	+19%
Yandicoogina Fines (HIY)	13.6	+1%	+15%	39.2	-6%
Total Pilbara production	70.9	0%	+3%	206.7	+5%
Total Pilbara production (100% basis)	83.5	-1%	+3%	244.0	+4%

Rio Tinto share of shipments (Million tonnes)	Q3 2023	vs Q3 2022	vs Q2 2023	9 MTHS 2023	vs 9 MTHS 2022
Pilbara Blend Lump	14.8	-3%	+1%	45.2	+16%
Pilbara Blend Fines	25.4	-20%	-8%	81.4	+4%
Robe Valley Lump	1.3	+1%	+13%	3.5	+20%
Robe Valley Fines	2.7	+13%	+9%	7.5	+16%
Yandicoogina Fines (HIY)	13.7	+1%	+9%	39.9	-5%
SP10 Lump ¹	4.2	+154%	+153%	7.5	-24%
SP10 Fines ¹	9.7	+158%	+47%	23.1	+31%
Total Pilbara shipments ²	71.7	+3%	+8%	208.1	+6%
Total Pilbara shipments (100% basis) ²	83.9	+1%	+6%	245.5	+5%
Total Pilbara Shipments (consolidated basis) ^{2, 3}	73.6	+3%	+8%	213.4	+6%

Production figures are sometimes more precise than the rounded numbers shown, hence small rounding differences may appear.

¹SP10 includes other lower grade products.

²Shipments includes material shipped from the Pilbara to our portside trading facility in China which may not be sold onwards by the group in the same period.

³While Rio Tinto has a 53% net beneficial interest in Robe River Iron Associates, it recognises 65% of the assets, liabilities, sales revenues and expenses in its accounts (as 30% is held through a 60% owned subsidiary and 35% is held through a 100% owned subsidiary). The consolidated basis sales reported here include Robe River Iron Associates on a 65% basis to enable comparison with revenue reported in the financial statements.

Pilbara operations

We produced 83.5 million tonnes (Rio Tinto share 70.9 million tonnes) in the third quarter, 1% lower than the corresponding period of 2022.

Shipments of 83.9 million tonnes (Rio Tinto share 71.7 million tonnes) were 1% higher than the third quarter of 2022, and 6% higher than the prior quarter.

SP10 was a larger proportion of shipments during the third quarter (17%¹), and are expected to remain elevated in the next period.

Shipments in the first nine months of 2023 were 5% higher than the first nine months of 2022 reflecting improved performance across the Pilbara system, ramp up of our Gudai-Darri mine and an uplift in productivity from implementation of the Safe Production System. We continue to expect full year shipments in the upper half of the original 320 to 335 million tonne range, which includes a 5 million tonne benefit from the implementation of the Safe Production System. SP10 volumes are expected to account for 45 to 50 million tonnes of 2023 shipments (13% to 15%¹).

Approximately 10% of sales in the nine months were priced by reference to the prior quarter's average index lagged by one month. The remainder was sold either on current quarter average, current month average, average of two months, forward month or on the spot market. Approximately 26% of sales in the nine months were made on a free on board (FOB) basis, with the remainder sold including freight.

In early October, we hosted a site tour of our Pilbara operations for investors and analysts. Presentation materials for this visit are available on our [website](#).

China Portside Trading

We continue to see strong demand for Rio Tinto's portside product in China. Our iron ore portside sales were 17.5 million tonnes in the first nine months of 2023 (19.5 million tonnes in the first nine months of 2022). At 30 September, inventory levels were 6.3 million tonnes, including 3.1 million tonnes of Pilbara product. In the first nine months of 2023 approximately 87% of our portside sales were either screened or blended in Chinese ports.

¹Based on total Pilbara shipments on a 100% basis.

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Aluminium

Rio Tinto share of production ('000 tonnes)	Q3 2023	vs Q3 2022	vs Q2 2023	9 MTHS 2023	vs 9 MTHS 2022
Bauxite	13,940	+2%	+3%	39,521	-5%
Bauxite third party shipments	9,550	+6%	+4%	26,588	-8%
Alumina	1,897	+3%	+2%	5,618	0%
Aluminium	828	+9%	+2%	2,427	+9%

Bauxite

Bauxite production of 13.9 million tonnes was 2% higher than the third quarter of 2022 as we achieved the initial benefits of stabilising our operations, particularly at Weipa where equipment reliability and performance improved.

We shipped 9.5 million tonnes of bauxite to third parties in the third quarter, 6% higher than the same period of 2022.

Alumina

Alumina production of 1.9 million tonnes was 3% higher than the third quarter of 2022 as operational stability improved at our Yarwun and Queensland Alumina Limited (QAL) refineries.

As the result of QAL activation of a step-in process following sanction measures by the Australian Government, Rio Tinto has taken on 100% of capacity for as long as the step-in continues. This results in use of Rusal's 20% share of capacity by Rio Tinto under the tolling arrangement with QAL. This additional output is excluded from the production tables in this report as QAL remains 80% owned by Rio Tinto and 20% owned by Rusal.

Aluminium

Aluminium production of 0.8 million tonnes was 9% higher than the third quarter of 2022 as we returned to full capacity at our Kitimat smelter and completed cell recovery efforts at our Boyne smelter. With Kitimat back at full capacity, we are focussed on improving stability and removing associated start-up costs to normalise profitability of the smelter.

All our other smelters continued to demonstrate stable performance during the quarter.

Copper

Rio Tinto share of production ('000 tonnes)	Q3 2023	vs Q3 2022	vs Q2 2023	9 MTHS 2023	vs 9 MTHS 2022
Mined copper					
Kennecott	48.8	-4%	+97%	103.8	-21%
Escondida	78.6	+5%	+2%	228.3	+1%
Oyu Tolgoi (66% basis) ¹	27.7	+128%	-2%	84.1	+158%
Total mined copper production	155.1	+12%	+19%	416.2	+7%
Total mined copper production (consolidated basis ²)	169.4	+5%	+17%	459.6	+1%
Refined copper					
Kennecott	18.5	-53%	+28%	76.6	-32%
Escondida	15.6	+5%	-28%	52.6	+14%

¹Oyu Tolgoi production for 2022 reported on a 33.52% equity share basis. Following the acquisition of Turquoise Hill Resources Ltd on 16 December 2022, Oyu Tolgoi production for 2023 reported on a 66% equity share basis.

²Includes Oyu Tolgoi and Kennecott on a 100% consolidated basis, and Escondida on an equity share basis.

Kennecott

Mined copper production was 4% lower than the third quarter of 2022 as the concentrator returned to full capacity during the period, recovering from the conveyor failure which occurred in March 2023.

Refined copper production was 53% lower than the third quarter of 2022 as we completed the largest rebuild of the smelter and refinery in Kennecott's history during the quarter. The ~\$300 million rebuild incorporated approximately 300 engineering and maintenance projects, and a workforce of ~3,200. The refinery and smelter were safely restarted during the period, with production expected to ramp up during the fourth quarter. The scope of works included a rebuild of the flash converting furnace, which was restarted late in the third quarter.

Escondida

Mined copper production was 5% higher than the third quarter of 2022 driven by higher copper feed grades combined with increased sulphide leach stacking volumes.

Refined production was 5% higher than the third quarter of 2022 due to improved oxide leach performance.

Oyu Tolgoi

Mined copper production on a 100% basis increased 16% from the third quarter of 2022 as the ramp-up in underground production continued to plan, delivering higher average copper head grades (0.52% vs. 0.42%). During the quarter we delivered 0.9 million tonnes of ore milled from the underground mine at an average copper head grade of 1.73%, and 8.8 million tonnes from the open pit with an average grade of 0.39%.

Following our acquisition of Turquoise Hill Resources Ltd on 16 December 2022, our equity share of production increased from 33.52% to 66%, effective in reporting from 1 January 2023. We continue to fully consolidate Oyu Tolgoi in our financials.

Minerals

Rio Tinto share of production (million tonnes)	Q3 2023	vs Q3 2022	vs Q2 2023	9 MTHS 2023	vs 9 MTHS 2022
Iron ore pellets and concentrate					
IOC	2.4	-14%	+16%	7.0	-10%
Rio Tinto share of production ('000 tonnes)					
Minerals					
Borates - B ₂ O ₃ content	127	-2%	-5%	384	-2%
Titanium dioxide slag	247	-20%	-19%	835	-5%
Rio Tinto share of production ('000 carats)					
Diavik	757	-36%	-22%	2,681	-20%

Iron Ore Company of Canada (IOC)

Iron ore production was 14% lower than the third quarter of 2022, as operations were impacted by extended plant downtime and conveyor belt failures, while we also recovered from wildfires which took place in Northern Quebec in the prior quarter. Given these challenges our full year production guidance has been reduced to 9.3 to 9.8 million tonnes (previously 10.0 to 11.0 million tonnes).

Shipments were 17% lower than the third quarter of 2022, driven by lower production. Logistics have resumed full operations following the wildfires, however disruptions remain a risk as we repair areas of the rail line damaged by fire.

Borates

Borates production in the third quarter was 2% lower than the corresponding period of 2022 due to weak market conditions and the impact of bad weather.

Iron and Titanium

Titanium dioxide slag production was 20% lower than the third quarter of 2022. Two furnaces at our Rio Tinto Iron and Titanium (RTIT) Quebec Operations remain offline following process safety incidents in June and July which we are currently investigating. In addition, we continue to see weakness in the titanium dioxide feedstock market.

On 23 August, we [announced](#) an agreement with the Government of Madagascar on the future fiscal arrangement for QMM and renewed our long-term partnership for the sustainable operation of the QMM mine in Fort Dauphin, Madagascar. The new agreement was confirmed by the High Constitutional Court of Madagascar on 8 August and signed by the parties on 22 August. Under the terms of the agreement, there will be an increase in the royalty rate from 2% to 2.5% and QMM will issue its first dividend to the Government of Madagascar in 2023.

Diamonds

At Diavik, our share of carats was 36% lower than the third quarter of 2022 due to the completion of an underground pipe and area of the open pit during the prior period.

Exploration and evaluation

Pre-tax and pre-divestment expenditure on exploration and evaluation charged to the profit and loss account in the first nine months of 2023, excluding Simandou, was \$613 million, compared with \$506 million in the first nine months of 2022 on the same basis. Approximately 33% of the spend was by central exploration, 31% by Minerals, 27% by Copper and 8% by Iron Ore.

Our annual budget for central greenfield exploration remains around \$250 million, mainly focused on copper, with a growing battery minerals programme.

Exploration highlights

Rio Tinto has a strong portfolio of projects with activity in 18 countries across eight commodities in early exploration and studies stages. The bulk of the exploration expenditure in the third quarter focused on copper in Australia, Kazakhstan, Peru, US and Zambia, nickel in Peru and Canada and lithium in Canada. Rio Tinto recently partnered in a lithium opportunity in Rwanda and greenfield lithium exploration continues in Canada, Australia, US and Africa. Rio Tinto has also partnered into a rutile opportunity in Malawi and continues to explore for heavy mineral sands in South Africa. Exploration for nickel is ongoing in Brazil, Canada, Finland and Peru. Mine-lease exploration continued at Rio Tinto managed businesses including Bingham Canyon in the US and Pilbara Iron Ore in Australia.

A summary of activity for the quarter is as follows:

Commodities	Studies Stage	Advanced projects	Greenfield/ Brownfield programmes
Bauxite			Melville Island, Australia Cape York, Australia
Battery Materials	Rincon Lithium, Argentina Lithium borates: Jadar, Serbia Nickel: Tamarack, US (3rd party operated)		Nickel Greenfield: Australia, Brazil, Canada, Finland, Peru Lithium Greenfield: Australia, Brazil, Canada, Chile, China, Finland, Rwanda, US Lithium borates Brownfield: US
Copper	Copper/molybdenum: Resolution, US Copper/Gold: Winu, Australia	Copper: La Granja, Peru Pribrezhniy, Kazakhstan Calibre-Magnum, Australia	Copper Greenfield: Angola, Australia, Brazil, Canada, Chile, China, Colombia, Finland, Kazakhstan, Namibia, Laos, Peru, Papua New Guinea, Serbia, US, Zambia Copper Brownfield: US
Diamonds	Falcon, Canada ²		Diamonds Greenfield: Angola Diamonds Brownfield: Diavik
Iron Ore	Pilbara, Australia Simandou, Guinea	Pilbara, Australia	Greenfield and Brownfield: Pilbara, Australia
Minerals	Potash: KL262 ³ , Canada Heavy mineral sands: Mutamba, Mozambique		Potash Greenfield: Canada Heavy mineral sands Greenfield: Australia, South Africa

¹Costs relating to the Simfer joint venture where the Government of Guinea holds 15% and Simfer Jersey holds 85%. Simfer Jersey is owned by Rio Tinto (53%) and Chalco Iron Ore Holdings (CIOH) (47%).

²The Falcon Project in Saskatchewan, Canada, is currently in care and maintenance whilst Rio Tinto considers alternative commercial options, including potential exit.

³Limited activity during the quarter.

Forward-looking statement

This announcement includes "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. All statements other than statements of historical facts included in this announcement, including, without limitation, those regarding Rio Tinto's financial position, business strategy, plans and objectives of management for future operations (including development plans and objectives relating to Rio Tinto's products, production forecasts and reserve and resource positions and any statements related to the ongoing impact of the COVID-19 pandemic), are forward-looking statements. The words "intend", "aim", "project", "anticipate", "estimate", "plan", "believes", "expects", "may", "would", "should", "could", "will", "target", "set to", "seek", "risk" or similar expressions, commonly identify such forward-looking statements.

Such forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of Rio Tinto, or industry results, to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Such forward-looking statements are based on numerous assumptions regarding Rio Tinto's present and future business strategies and the environment in which Rio Tinto will operate in the future. Among the important factors that could cause Rio Tinto's actual results, performance or achievements to differ materially from those in the forward-looking statements are levels of actual production during any period, levels of demand and market prices, the ability to produce and transport products profitably, the impact of foreign currency exchange rates on market prices and operating costs, operational problems, political uncertainty and economic conditions in relevant areas of the world, the actions of competitors, activities by governmental authorities such as changes in taxation or regulation, the risks and uncertainties associated with the ongoing impacts of COVID-19 or other pandemic and such other risk factors identified in Rio Tinto's most recent Annual report and accounts in Australia and the United Kingdom and the most recent Annual report on Form 20-F filed with the United States Securities and Exchange Commission (the "SEC") or Form 6-Ks furnished to, or filed with, the SEC. The above list is not exhaustive. Forward-looking statements should, therefore, be construed in light of such risk factors and undue reliance should not be placed on forward-looking statements, particularly in light of the current economic climate and the significant volatility, uncertainty and disruption caused by the outbreak of COVID-19. These forward-looking statements speak only as of the date of this announcement. Rio Tinto expressly disclaims any obligation or undertaking (except as required by applicable law, the UK Listing Rules, the Disclosure Guidance and Transparency Rules of the Financial Conduct Authority and the Listing Rules of the Australian Securities Exchange) to release publicly any updates or revisions to any forward-looking statement contained herein to reflect any change in Rio Tinto's expectations with regard thereto or any change in events, conditions or circumstances on which any such statement is based.

Nothing in this announcement should be interpreted to mean that future earnings per share of Rio Tinto plc or Rio Tinto Limited will necessarily match or exceed its historical published earnings per share.

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This announcement is authorised for release to the market by Andy Hodges, Rio Tinto's Group Company Secretary.

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Classification: 3.1 Additional regulated information required to be disclosed under the laws of a Member State

Rio Tinto production summary

Rio Tinto share of production

		Quarter			9 Months		% change		9 MTHS 2023 vs 9 MTHS
		2022 Q3	2023 Q2	2023 Q3	2022 9 MTHS	2023 9 MTHS	Q3 23 vs Q3 22	Q3 23 vs Q2 23	
Principal commodities									
Alumina	(’000 t)	1,838	1,861	1,897	5,603	5,618	+3%	+2%	0%
Aluminium	(’000 t)	759	814	828	2,226	2,427	+9%	+2%	+9%
Bauxite	(’000 t)	13,680	13,492	13,940	41,437	39,521	+2%	+3%	-5%
Borates	(’000 t)	130	133	127	391	384	-2%	-5%	-2%
Copper - mined	(’000 t)	138.0	130.5	155.1	389.9	416.2	+12%	+19%	+7%
Copper - refined	(’000 t)	54.1	36.2	34.1	158.2	129.2	-37%	-6%	-18%
Diamonds	(’000 cts)	1,192	970	757	3,333	2,681	-37%	-22%	-20%
Iron Ore	(’000 t)	73,726	70,632	73,241	204,832	213,657	-1%	+4%	+4%
Titanium dioxide slag	(’000 t)	310	303	247	876	835	-20%	-19%	-5%
Other Metals & Minerals									
Gold - mined	(’000 oz)	58.2	61.4	80.2	179.3	205.9	+38%	+31%	+15%
Gold - refined	(’000 oz)	30.5	19.2	12.4	83.6	53.6	-59%	-35%	-36%
Molybdenum	(’000 t)	0.8	0.3	0.6	2.3	1.1	-23%	+100%	-54%
Salt	(’000 t)	1,674	1,652	1,434	4,299	4,535	-14%	-13%	+5%
Silver - mined	(’000 oz)	1,040	775	1,001	2,898	2,711	-4%	+29%	-6%
Silver - refined	(’000 oz)	571	329	240	1,438	1,001	-58%	-27%	-30%

Throughout this report, figures in italics indicate adjustments made since the figure was previously quoted on the equivalent page or reported for the first time. Production figures are sometimes more precise than the rounded numbers shown, hence small differences may result between the total of the quarter figures and the year to date figures.

Rio Tinto share of production

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
ALUMINA								
Production ('000 tonnes)								
Jonqui�re (Vaudreuil)	100 %	336	368	371	346	325	996	1,042
Jonqui�re (Vaudreuil) specialty Alumina plant	100 %	30	29	25	27	28	85	79
Queensland Alumina	80 %	662	678	632	677	720	2,062	2,029
S�o Luis (Alumar)	10 %	95	97	94	66	88	280	248
Yarwun	100 %	715	769	739	745	736	2,180	2,219
Rio Tinto total alumina production		1,838	1,941	1,860	1,861	1,897	5,603	5,618
ALUMINIUM								
Production ('000 tonnes)								
Australia - Bell Bay	100 %	46	48	45	46	47	137	139
Australia - Boyne Island	59 %	65	68	70	73	76	199	218
Australia - Tomago	52 %	76	76	75	75	77	226	227
Canada - six wholly owned	100 %	341	360	367	389	398	981	1,154
Canada - Alouette (Sept-�les)	40 %	64	63	62	63	64	188	189
Canada - B�cancour	25 %	29	29	29	29	28	86	87
Iceland - ISAL (Reykjavik)	100 %	51	52	51	52	52	151	155
New Zealand - Tiwai Point	79 %	67	68	66	66	66	199	198
Oman - Sohar	20 %	20	20	20	20	20	59	60
Rio Tinto total aluminium production		759	783	785	814	828	2,226	2,427
BAUXITE								
Production ('000 tonnes) (a)								
Gove	100 %	2,905	2,874	2,579	2,739	3,015	8,636	8,332
Porto Trombetas	12 %	393	391	275	327	391	941	992
Sangaredi	(b)	1,953	1,588	1,744	1,614	1,524	5,663	4,882
Weipa	100 %	8,429	8,328	7,492	8,813	9,010	26,197	25,315
Rio Tinto total bauxite production		13,680	13,181	12,089	13,492	13,940	41,437	39,521

(a) Mine production figures for metals refer to the total quantity of metal produced in concentrates, leach liquor or dor  bullion irrespective of whether these products are then refined onsite, except for the data for bauxite and iron ore which represent production of marketable quantities of ore plus concentrates and pellets.

(b) Rio Tinto has a 22.95% shareholding in the Sangaredi mine but benefits from 45.0% of production.

Rio Tinto share of production

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
BORATES								
Production ('000 tonnes B₂O₃ content)								
Rio Tinto Borates - borates	100 %	130	141	124	133	127	391	384
COPPER								
Mine production ('000 tonnes) (a)								
Bingham Canyon	100 %	50.7	47.5	30.3	24.8	48.8	131.7	103.8
Escondida	30 %	75.1	73.0	72.3	77.4	78.6	225.6	228.3
Oyu Tolgoi (b)	66 %	12.2	10.8	28.1	28.3	27.7	32.6	84.1
Rio Tinto total mine production		138.0	131.3	130.7	130.5	155.1	389.9	416.2
Rio Tinto total mine production - consolidated basis		162.1	152.8	145.2	145.0	169.4	454.4	459.6
Refined production ('000 tonnes)								
Escondida	30 %	14.9	14.9	15.2	21.7	15.6	46.0	52.6
Kennecott (c)	100 %	39.2	36.1	43.6	14.4	18.5	112.2	76.6
Rio Tinto total refined production		54.1	51.0	58.9	36.2	34.1	158.2	129.3

(a) Mine production figures for metals refer to the total quantity of metal produced in concentrates, leach liquor or doré bullion irrespective of whether these products are then refined onsite, except for the data for bauxite and iron ore which represent production of marketable quantities of ore plus concentrates and pellets.

(b) On 16 December 2022, Rio Tinto completed the acquisition of 100% of Turquoise Hill Resources Ltd, increasing our ownership in Oyu Tolgoi from 33.52% to 66%. From 1 January 2023, our share of production has been updated to reflect this change.

(c) We continue to process third party concentrate to optimise smelter utilisation. There was no cathode produced from purchased concentrate in 2023 year-to-date. Purchased and tolled copper concentrates are excluded from reported production figures and production guidance. Sales of cathodes produced from purchased concentrate are included in reported revenues.

DIAMONDS

Production ('000 carats)

Diavik	100 %	1,192	1,319	954	970	757	3,333	2,681
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GOLD

Mine production ('000 ounces) (a)

Bingham Canyon	100 %	32.5	29.7	20.6	18.7	32.0	93.1	71.3
Escondida	30 %	11.5	14.5	14.7	16.1	14.4	36.1	45.2
Oyu Tolgoi (b)	66 %	14.3	11.5	29.1	26.6	33.8	50.1	89.5
Rio Tinto total mine production		58.2	55.7	64.4	61.4	80.2	179.3	205.9

Refined production ('000 ounces)

Kennecott	100 %	30.5	30.3	22.0	19.2	12.4	83.6	53.6
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(a) Mine production figures for metals refer to the total quantity of metal produced in concentrates, leach liquor or doré bullion irrespective of whether these products are then refined onsite, except for the data for bauxite and iron ore which represent production of marketable quantities of ore plus concentrates and pellets.

(b) On 16 December 2022, Rio Tinto completed the acquisition of 100% of Turquoise Hill Resources Ltd, increasing our ownership in Oyu Tolgoi from 33.52% to 66%. From 1 January 2023, our share of production has been updated to reflect this change.

Rio Tinto share of production

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
IRON ORE								
Production ('000 tonnes) (a)								
Hamersley mines	(b)	56,650	61,339	54,433	55,004	57,322	156,965	166,760
Hope Downs	50 %	6,264	5,945	5,885	5,763	5,519	18,480	17,167
Iron Ore Company of Canada	59 %	2,776	2,530	2,526	2,063	2,384	7,783	6,973
Robe River - Pannawonica (Mesas J and A)	53 %	3,540	4,178	3,123	3,897	4,106	9,368	11,126
Robe River - West Angelas	53 %	4,496	4,424	3,816	3,905	3,910	12,237	11,631
Rio Tinto iron ore production ('000 tonnes)		73,726	78,415	69,784	70,632	73,241	204,832	213,657
Breakdown of Production:								
Pilbara Blend and SP10 Lump (c)		21,317	21,443	19,612	21,042	21,418	57,708	62,073
Pilbara Blend and SP10 Fines (c)		32,592	35,097	30,851	31,750	31,700	88,490	94,301
Robe Valley Lump		1,389	1,645	1,136	1,488	1,665	3,619	4,290
Robe Valley Fines		2,151	2,533	1,987	2,409	2,441	5,749	6,836
Yandicoogina Fines (HIY)		13,501	15,168	13,672	11,880	13,633	41,482	39,185
Pilbara iron ore production ('000 tonnes)		70,951	75,886	67,258	68,569	70,857	197,049	206,683
IOC Concentrate		1,237	1,186	1,241	1,120	1,137	3,480	3,498
IOC Pellets		1,539	1,343	1,285	943	1,247	4,302	3,475
IOC iron ore production ('000 tonnes)		2,776	2,530	2,526	2,063	2,384	7,783	6,973
Breakdown of Shipments:								
Pilbara Blend Lump		15,301	15,089	15,689	14,691	14,812	38,794	45,192
Pilbara Blend Fines		31,597	32,659	28,528	27,474	25,375	78,452	81,377
Robe Valley Lump		1,281	1,244	1,051	1,152	1,297	2,926	3,499
Robe Valley Fines		2,392	2,896	2,262	2,489	2,706	6,433	7,457
Yandicoogina Fines (HIY)		13,530	14,661	13,689	12,558	13,669	42,219	39,916
SP10 Lump (c)		1,647	2,824	1,686	1,652	4,180	9,930	7,518
SP10 Fines (c)		3,766	5,062	6,832	6,613	9,699	17,609	23,145
Pilbara iron ore shipments ('000 tonnes) (d)		69,515	74,435	69,738	66,629	71,736	196,363	208,103
Pilbara iron ore shipments - consolidated basis ('000 tonnes) (d) (f)		71,379	76,303	71,505	68,322	73,553	201,310	213,380
IOC Concentrate		1,316	1,174	984	1,247	1,232	3,000	3,463
IOC Pellets		1,443	1,036	1,143	1,352	1,066	4,339	3,560
IOC Iron ore shipments ('000 tonnes) (d)		2,759	2,210	2,127	2,599	2,298	7,339	7,023
Rio Tinto iron ore shipments ('000 tonnes) (d)		72,274	76,645	71,864	69,228	74,034	203,701	215,127
Rio Tinto iron ore sales ('000 tonnes) (e)		74,587	75,337	74,273	71,678	74,488	212,533	220,439

(a) Mine production figures for metals refer to the total quantity of metal produced in concentrates, leach liquor or doré bullion irrespective of whether these products are then refined onsite, except for the data for bauxite and iron ore which represent production of marketable quantities of ore plus concentrates and pellets.

(b) Includes 100% of production from Paraburdoo, Mt Tom Price, Western Turner Syncline, Marandoo, Yandicoogina, Brockman, Nammuldi, Silvergrass, Channar, Gudai-Darri and the Eastern Range mines. Whilst Rio Tinto owns 54% of the Eastern Range mine, under the terms of the joint venture agreement, Hamersley Iron manages the operation and is obliged to purchase all mine production from the joint venture and therefore all of the production is included in Rio Tinto's share of production.

(c) SP10 includes other lower grade products.

(d) Shipments includes material shipped to our portside trading facility in China which may not be sold onwards in the same period.

(e) Represents the difference between amounts shipped to portside trading and onward sales from portside trading, and third party volumes sold.

(f) While Rio Tinto has a 53% net beneficial interest in Robe River Iron Associates, it recognises 65% of the assets, liabilities, sales revenues and expenses in its accounts (as 30% is held through a 60% owned subsidiary and 35% is held through a 100% owned subsidiary). The consolidated basis sales reported here include Robe River Iron Associates on a 65% basis to enable comparison with revenue reported in the financial statements.

Rio Tinto share of production

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
MOLYBDENUM								
Mine production ('000 tonnes) (a)								
Bingham Canyon	100 %	0.8	1.1	0.1	0.3	0.6	2.3	1.1

(a) Mine production figures for metals refer to the total quantity of metal produced in concentrates, leach liquor or doré bullion irrespective of whether these products are then refined onsite, except for the data for bauxite and iron ore which represent production of marketable quantities of ore plus concentrates and pellets.

SALT								
Production ('000 tonnes)								
Dampier Salt	68 %	1,674	1,458	1,450	1,652	1,434	4,299	4,535

SILVER								
Mine production ('000 ounces) (a)								
Bingham Canyon	100 %	591	521	356	296	462	1,537	1,114
Escondida	30 %	363	453	404	302	350	1,137	1,056
Oyu Tolgoi (b)	66 %	86	68	176	177	189	224	541
Rio Tinto total mine production		1,040	1,042	935	775	1,001	2,898	2,711
Refined production ('000 ounces)								
Kennecott	100 %	571	512	432	329	240	1,438	1,001

(a) Mine production figures for metals refer to the total quantity of metal produced in concentrates, leach liquor or doré bullion irrespective of whether these products are then refined onsite, except for the data for bauxite and iron ore which represent production of marketable quantities of ore plus concentrates and pellets.

(b) On 16 December 2022, Rio Tinto completed the acquisition of 100% of Turquoise Hill Resources Ltd, increasing our ownership in Oyu Tolgoi from 33.52% to 66%. From 1 January 2023, our share of production has been updated to reflect this change.

TITANIUM DIOXIDE SLAG								
Production ('000 tonnes)								
Rio Tinto Iron & Titanium (a)	100 %	310	323	285	303	247	876	835

(a) Quantities comprise 100% of Rio Tinto Fer et Titane and Rio Tinto's 74% interest in Richards Bay Minerals (RBM).

Production figures are sometimes more precise than the rounded numbers shown, hence small differences may result between the total of the quarter figures and the year to date figures.

Rio Tinto percentage interest shown above is at 30 September 2023.

Rio Tinto operational data

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
ALUMINA								
Smelter Grade Alumina - Aluminium Group								
Alumina production ('000 tonnes)								
<i>Australia</i>								
Queensland Alumina Refinery - Queensland	80 %	827	847	790	846	900	2,578	2,536
Yarwun refinery - Queensland	100 %	715	769	739	745	736	2,180	2,219
<i>Brazil</i>								
São Luis (Alumar) refinery	10 %	946	975	936	657	883	2,796	2,476
<i>Canada</i>								
Jonquière (Vaudreuil) refinery - Quebec (a)	100 %	336	368	371	346	325	996	1,042
<i>(a) Jonquière's (Vaudreuil's) production shows smelter grade alumina only and excludes hydrate produced and used for specialty alumina.</i>								
Speciality Alumina - Aluminium Group								
Speciality alumina production ('000 tonnes)								
<i>Canada</i>								
Jonquière (Vaudreuil) plant – Quebec	100 %	30	29	25	27	28	85	79

Rio Tinto percentage interest shown above is at 30 September 2023. The data represents production and sales on a 100% basis unless otherwise stated.

Rio Tinto operational data

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
ALUMINIUM								
Primary Aluminium								
Primary aluminium production ('000 tonnes)								
<i>Australia</i>								
Bell Bay smelter - Tasmania	100 %	46	48	45	46	47	137	139
Boyne Island smelter - Queensland	59 %	110	114	117	123	127	336	367
Tomago smelter - New South Wales	52 %	148	147	145	146	149	439	441
<i>Canada</i>								
Alma smelter - Quebec	100 %	122	122	120	121	121	360	361
Alouette (Sept-Îles) smelter - Quebec	40 %	159	158	156	159	159	470	474
Arvida smelter - Quebec	100 %	43	44	43	43	43	127	129
Arvida AP60 smelter - Quebec	100 %	15	15	14	14	15	43	43
Bécancour smelter - Quebec	25 %	116	116	115	118	114	344	346
Grande-Baie smelter - Quebec	100 %	59	58	57	57	58	174	171
Kitimat smelter - British Columbia	100 %	38	57	72	92	103	88	268
Laterrière smelter - Quebec	100 %	64	64	61	62	59	190	182
<i>Iceland</i>								
ISAL (Reykjavik) smelter	100 %	51	52	51	52	52	151	155
<i>New Zealand</i>								
Tiwai Point smelter	79 %	85	85	83	83	83	251	249
<i>Oman</i>								
Sohar smelter	20 %	100	100	98	99	100	295	298

Rio Tinto percentage interest shown above is at 30 September 2023. The data represents production and sales on a 100% basis unless otherwise stated.

Rio Tinto operational data

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
BAUXITE								
Bauxite production ('000 tonnes)								
<i>Australia</i>								
Gove mine - Northern Territory	100 %	2,905	2,874	2,579	2,739	3,015	8,636	8,332
Weipa mine - Queensland	100 %	8,429	8,328	7,492	8,813	9,010	26,197	25,315
<i>Brazil</i>								
Porto Trombetas (MRN) mine	12 %	3,275	3,256	2,288	2,724	3,258	7,844	8,271
<i>Guinea</i>								
Sangaredi mine (a)	23 %	4,339	3,530	3,876	3,586	3,387	12,585	10,848
Rio Tinto share of bauxite shipments								
Share of total bauxite shipments ('000 tonnes)		13,294	13,561	12,264	13,603	13,954	41,223	39,821
Share of third party bauxite shipments ('000 tonnes)		9,049	9,233	7,880	9,159	9,550	28,783	26,588

(a) Rio Tinto has a 22.95% shareholding in the Sangaredi mine but benefits from 45.0% of production.

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
BORATES								
Rio Tinto Borates - borates	100 %							
<i>US</i>								
Borates ('000 tonnes) (a)		130	141	124	133	127	391	384

(a) Production is expressed as B₂O₃ content.

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
COPPER & GOLD								
Escondida	30 %							
<i>Chile</i>								
Sulphide ore to concentrator ('000 tonnes)		32,894	33,911	33,309	30,749	33,332	97,447	97,390
Average copper grade (%)		0.83	0.76	0.78	0.93	0.85	0.84	0.85
Mill production (metals in concentrates):								
Contained copper ('000 tonnes)		214.6	212.8	210.0	228.9	225.7	645.5	664.6
Contained gold ('000 ounces)		38.2	48.4	49.0	53.5	48.1	120.3	150.5
Contained silver ('000 ounces)		1,210	1,510	1,346	1,008	1,168	3,791	3,521
Recoverable copper in ore stacked for leaching ('000 tonnes) (a)		35.8	30.4	31.0	29.1	36.4	106.5	96.6
Refined production from leach plants:								
Copper cathode production ('000 tonnes)		49.6	49.7	50.8	72.4	52.0	153.4	175.2

(a) The calculation of copper in material mined for leaching is based on ore stacked at the leach pad.

Rio Tinto percentage interest shown above is at 30 September 2023. The data represents production and sales on a 100% basis unless otherwise stated.

Rio Tinto operational data

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
COPPER & GOLD (continued)								
Kennecott								
Bingham Canyon mine	100 %							
<i>Utah, US</i>								
Ore treated ('000 tonnes)		10,125	10,449	7,405	5,339	9,804	27,116	22,548
Average ore grade:								
Copper (%)		0.56	0.52	0.47	0.52	0.56	0.54	0.52
Gold (g/t)		0.16	0.14	0.12	0.16	0.16	0.17	0.15
Silver (g/t)		2.50	2.20	2.16	2.36	2.10	2.42	2.18
Molybdenum (%)		0.021	0.020	0.012	0.018	0.018	0.020	0.016
Copper concentrates produced ('000 tonnes)		192	184	116	92	180	504	388
Average concentrate grade (% Cu)		26.2	25.6	26.1	26.8	26.8	26.1	26.6
Production of metals in copper concentrates:								
Copper ('000 tonnes) (a)		50.7	47.5	30.3	24.8	48.8	131.7	103.8
Gold ('000 ounces)		32.5	29.7	20.6	18.7	32.0	93.1	71.3
Silver ('000 ounces)		591	521	356	296	462	1,537	1,114
Molybdenum concentrates produced ('000 tonnes):								
Molybdenum in concentrates ('000 tonnes)		1.8	2.0	0.1	0.6	1.4	4.8	2.1
		0.8	1.1	0.1	0.3	0.6	2.3	1.1
Kennecott smelter & refinery								
	100 %							
Copper concentrates smelted ('000 tonnes)		166	194	200	41	59	531	299
Copper anodes produced ('000 tonnes) (b)		46.2	24.5	55.1	18.2	1.4	120.0	74.8
Production of refined metal:								
Copper ('000 tonnes) (c)		39.2	36.1	43.6	14.4	18.5	112.2	76.6
Gold ('000 ounces) (d)		30.5	30.3	22.0	19.2	12.4	83.6	53.6
Silver ('000 ounces) (d)		571	512	432	329	240	1,438	1,001

(a) Includes a small amount of copper in precipitates.

(b) New metal excluding recycled material.

(c) We continue to process third party concentrate to optimise smelter utilisation. There was no cathode produced from purchased concentrate in 2023 year-to-date. Purchased and tolled copper concentrates are excluded from reported production figures and production guidance. Sales of cathodes produced from purchased concentrate are included in reported revenues.

(d) Includes gold and silver in intermediate products.

Rio Tinto percentage interest shown above is at 30 September 2023. The data represents production and sales on a 100% basis unless otherwise stated.

Rio Tinto operational data

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
COPPER & GOLD (continued)								
Oyu Tolgoi mine (a)	66 %							
<i>Mongolia</i>								
Ore Treated ('000 tonnes) - Open Pit		10,141	8,900	9,613	8,809	8,789	28,686	27,210
Ore Treated ('000 tonnes) - Underground		544	510	675	900	900	1,265	2,475
Ore Treated ('000 tonnes) - Total		10,685	9,411	10,288	9,709	9,689	29,951	29,685
Average mill head grades:								
Open Pit								
Copper (%)		0.40	0.41	0.43	0.41	0.39	0.40	0.41
Gold (g/t)		0.22	0.20	0.21	0.19	0.25	0.27	0.22
Silver (g/t)		1.28	1.14	1.16	1.10	1.19	1.22	1.15
Underground								
Copper (%)		0.82	1.03	1.36	1.56	1.73	0.64	1.57
Gold (g/t)		0.22	0.29	0.35	0.38	0.37	0.22	0.37
Silver (g/t)		2.16	2.54	3.26	3.67	3.94	1.78	3.66
Total								
Copper (%)		0.42	0.45	0.49	0.52	0.52	0.41	0.51
Gold (g/t)		0.22	0.21	0.22	0.21	0.26	0.27	0.23
Silver (g/t)		1.32	1.21	1.30	1.34	1.44	1.24	1.36
Copper concentrates produced ('000 tonnes)		173.6	151.9	201.8	200.3	197.6	463.9	599.7
Average concentrate grade (% Cu)		20.9	21.3	21.1	21.4	21.3	20.9	21.2
Production of metals in concentrates:								
Copper in concentrates ('000 tonnes)		36.3	32.3	42.6	42.8	42.0	97.1	127.4
Gold in concentrates ('000 ounces)		42.7	34.2	44.1	40.3	51.2	149.6	135.6
Silver in concentrates ('000 ounces)		256	204	266	268	287	668	820
Sales of metals in concentrates:								
Copper in concentrates ('000 tonnes)		41.8	25.3	41.4	43.2	42.7	107.0	127.3
Gold in concentrates ('000 ounces)		56.0	26.2	44.0	40.4	48.7	181.3	133.1
Silver in concentrates ('000 ounces)		282	152	242	257	269	684	768

(a) On 16 December 2022, Rio Tinto completed the acquisition of 100% of Turquoise Hill Resources Ltd, increasing our ownership in Oyu Tolgoi from 33.52% to 66%. From 1 January 2023, our share of production has been updated to reflect this change.

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
DIAMONDS								
Diavik Diamonds	100 %							
<i>Northwest Territories, Canada</i>								
Ore processed ('000 tonnes)		590	535	427	446	427	1,623	1,300
Diamonds recovered ('000 carats)		1,192	1,319	954	970	757	3,333	2,681

Rio Tinto percentage interest shown above is at 30 September 2023. The data represents production and sales on a 100% basis unless otherwise stated.

Rio Tinto operational data

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
IRON ORE								
Rio Tinto Iron Ore								
<i>Western Australia</i>								
Pilbara Operations								
Saleable iron ore production ('000 tonnes)								
Hamersley mines	(a)	56,650	61,339	54,433	55,004	57,322	156,965	166,760
Hope Downs	50 %	12,529	11,891	11,771	11,527	11,037	36,959	34,335
Robe River - Pannawonica (Mesas J and A)	53 %	6,679	7,882	5,892	7,353	7,747	17,676	20,992
Robe River - West Angelas	53 %	8,484	8,347	7,200	7,368	7,377	23,088	21,945
Total production ('000 tonnes)		84,342	89,458	79,296	81,251	83,484	234,687	244,031
Breakdown of total production:								
Pilbara Blend and SP10 Lump (b)		25,452	25,251	23,196	24,910	25,268	69,507	73,374
Pilbara Blend and SP10 Fines (b)		38,709	41,158	36,537	37,108	36,836	106,023	110,481
Robe Valley Lump		2,621	3,103	2,143	2,808	3,142	6,829	8,094
Robe Valley Fines		4,058	4,779	3,748	4,544	4,605	10,846	12,898
Yandicoogina Fines (HIY)		13,501	15,168	13,672	11,880	13,633	41,482	39,185
Breakdown of total shipments:								
Pilbara Blend Lump		18,860	18,153	18,733	17,757	17,785	48,529	54,274
Pilbara Blend Fines		38,186	38,835	35,349	33,668	31,008	98,344	100,026
Robe Valley Lump		2,417	2,348	1,983	2,173	2,447	5,521	6,603
Robe Valley Fines		4,514	5,464	4,268	4,696	5,105	12,137	14,070
Yandicoogina Fines (HIY)		13,530	14,661	13,689	12,558	13,669	42,219	39,916
SP10 Lump (b)		1,647	2,824	1,686	1,652	4,180	9,930	7,518
SP10 Fines (b)		3,766	5,062	6,832	6,613	9,699	17,609	23,145
Total shipments ('000 tonnes) (c)		82,920	87,347	82,540	79,118	83,892	234,289	245,550
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	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
Iron Ore Company of Canada								
59 %								
<i>Newfoundland & Labrador and Quebec in Canada</i>								
Saleable iron ore production:								
Concentrates ('000 tonnes)		2,106	2,020	2,113	1,908	1,936	5,927	5,957
Pellets ('000 tonnes)		2,621	2,288	2,189	1,605	2,124	7,327	5,918
IOC Total production ('000 tonnes)		4,727	4,308	4,302	3,513	4,060	13,254	11,875
Shipments:								
Concentrates ('000 tonnes)		2,241	1,999	1,676	2,124	2,098	5,108	5,897
Pellets ('000 tonnes)		2,457	1,764	1,947	2,302	1,815	7,390	6,063
IOC Total Shipments ('000 tonnes) (c)		4,699	3,763	3,622	4,426	3,913	12,498	11,961
Global Iron Ore Totals								
Iron Ore Production ('000 tonnes)		89,069	93,766	83,599	84,764	87,543	247,941	255,906
Iron Ore Shipments ('000 tonnes)		87,619	91,110	86,162	83,543	87,805	246,787	257,511
Iron Ore Sales ('000 tonnes) (d)		89,689	89,650	88,490	85,601	88,030	254,991	262,121

(a) Includes 100% of production from Paraburdoo, Mt Tom Price, Western Turner Syncline, Marandoo, Yandicoogina, Brockman, Nammuldi, Silvergrass, Channar, Gudai-Darri and the Eastern Range mines. Whilst Rio Tinto owns 54% of the Eastern Range mine, under the terms of the joint venture agreement, Hamersley Iron manages the operation and is obliged to purchase all mine production from the joint venture and therefore all of the production is included in Rio Tinto's share of production.

(b) SP10 includes other lower grade products.

(c) Shipments includes material shipped to our portside trading facility in China which may not be sold onwards in the same period.

(d) Include Pilbara and IOC sales adjusted for portside trading movements and third party volumes sold.

Rio Tinto percentage interest shown above is at 30 September 2023. The data represents production and sales on a 100% basis unless otherwise stated.

Rio Tinto operational data

	Rio Tinto interest	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	9 MTHS 2022	9 MTHS 2023
SALT								
Dampier Salt	68 %							
<i>Western Australia</i>								
Salt production ('000 tonnes)		2,449	2,133	2,121	2,416	2,097	6,289	6,634
TITANIUM DIOXIDE SLAG								
Rio Tinto Iron & Titanium	100 %							
<i>Canada and South Africa</i>								
(Rio Tinto share) (a)								
Titanium dioxide slag ('000 tonnes)		310	323	285	303	247	876	835

(a) Quantities comprise 100% of Rio Tinto Fer et Titane and Rio Tinto's 74% interest in Richards Bay Minerals' production. Ilmenite mined in Madagascar is being processed in Canada.

Rio Tinto percentage interest shown above is at 30 September 2023. The data represents production and sales on a 100% basis unless otherwise stated.