

## **Speaker notes to accompany the presentation at the Diggers and Dealers Conference**

### **Slide 1 – Breaking Cover**

Many thanks for that kind introduction and good afternoon ladies and gentlemen.

It is my pleasure to be back here at Diggers today to talk with you about Rio Tinto's approach to exploration and to provide some insight into our current activities.

But first, I would like to acknowledge the traditional owners of the land on which we meet today, the Wangkatja people and pay my respects to their elders past, present and future.

Our exploration teams are often the first point of contact for Rio Tinto with community members and the positive, consultative and enduring relationships we establish are critical to our long-term success. Rio Tinto was the first resources company in Australia to sit down and negotiate with traditional owners back in the 1990s. We are proud of our progress since that time and our position as one of Australia's largest employers of indigenous people.

Let me start by giving you a little of my background. I did my undergraduate and Master's degrees in geology & physics before joining the Rio Tinto Group more than 33 years ago, exploring for copper and gold in PNG.

Since then I have had the privilege of a truly global career, living in 6 countries, working on projects in over 45 and visiting more than 100 on business. I have also been fortunate to pretty much look at the full A-Z of minerals and metals and seen a number of discoveries progress through to production.

In 2016 I was appointed as the Group Executive for Growth and Innovation at Rio Tinto. One of our primary functions in G&I is to discover and develop Rio Tinto's future assets.

So today I will talk specifically about exploration - a topic very close to my heart. I have spent the best part of my adult life working in and around our global exploration teams, and spent five years as our global head of exploration.

Today, I will speak on four topics – our global footprint, our discovery track record. The current industry context as well as our overall exploration strategy and how we are deploying technology to uncover that next big discovery.

Of course I'll talk to a few recent examples of success in our exploration portfolio as well. One of them you may have heard a little about in recent months as it is located not too far from here in the Paterson region.

## **Slide 2 – Cautionary statements**

Before I go on, I would just draw your attention to the general Cautionary Statements. Please note that any financial figures presented are in US dollars.

## **Slide 3 – Safety and exploration success have to go hand in hand**

As many of you will know, at Rio Tinto safety is our number one priority.

Our exploration teams cover a large geographic footprint, and wherever you go, the mantra is the same. There's no exploration success without a safety first mindset – the two have to go together.

We have worked hard over the last decade to improve our safety performance and we have made good progress but there's still a lot of work to do.

In 2012 we embarked on a change programme to improve project performance and we are now seeing real benefits including a marked reduction in the number and severity of our injuries.

## **Slide 4 – A truly global exploration footprint – well funded and very active**

Exploration has been a cornerstone of our business for more than 70 years and is core to our DNA. We've consistently funded exploration efforts through this period and in recent times our spend has averaged around \$200 million per year.

We have a team of about 400 hard-working people that explore globally for commodities that are essential for human progress. They are currently exploring for 7 different commodities across 17 countries.

In 2018, we spent \$231 million on greenfield exploration, split about 75% in OECD countries and Peru and 25% in non-OECD countries.

As you can see on the slide, our focus today is mostly on copper and diamonds, but we are really commodity agnostic. We have the ability to flex this focus in line with economic cycles and where we see the best opportunities.

Our exploration teams are very active and as their ultimate boss, I make sure of it each and every day!

We have assembled significant land packages around the world and are very actively drilling at this time. We are actually drilling the largest number of greenfield targets for close to two decades.

Exploration is a business to us. We run everything through a disciplined process keeping only the most attractive options. We actively divest non-core discoveries.

As an example between 2007 and 2018 we 'washed our face' on exploration spend. That is we spent around \$1.8 billion on greenfield exploration and returned roughly the same amount through divestments of non-core projects. As I like to say we are delivering organic options for our company to invest in essentially for free. And of course we would like more of these options.

## **Slide 5 – 7 decades of industry leading discovery performance**

At Rio Tinto, exploration has and continues to be well supported. It is seen not only as a core capability, but as a critical lever to add value and source growth opportunities. It is also a capability, which distinguishes us from many of our peers.

As you can see here, we have a strong history of success, spanning some seven decades. Where many mining companies have significantly cut exploration in recent years, we have maintained our commitment to it and it's paid off.

We would all love to own and operate only Tier 1 assets, but the reality is that the Tier 1 assets of today didn't all start life in that way. It is important that we expand our horizons to include those assets that are bankable, relatively low capital and low technical risk. They will not all be obvious Tier 1s from day 1. They often require ongoing development and exploration to build up truly Tier 1 status.

Interestingly the majority of Rio Tinto's core mining operations today were discovered and developed by us. This includes our world-class iron ore business founded on the Mount Tom Price discovery as well as our bauxite business in Queensland and the Argyle diamond mine here in WA.

We are confident that our track record of success, stable funding and technical capability will allow us to continue to uncover opportunities, that others may miss.

## **Slide 6 – A high conversion rate – a lot of our discoveries went into production**

Of course, we don't believe in exploration for exploration's sake – we ultimately judge our success by how many of our discoveries become projects. We are proud to say that nearly three quarters of all tier-1 and tier-2 discoveries made by the group since 1947 have become operational mines.

I think it is also important to call out our positive impact on the broader industry. As we saw in the previous slide, many of our divestments have become cornerstone businesses for other companies. I believe this symbiosis is often overlooked.

## **Slide 7 – The lost decade - the industry got busy being busy, but found less**

We have all seen this spend and discovery information before. Across the industry we saw the initial uptick in discoveries in the mid 2000's as commodity prices surged and money flowed back into the exploration sector. This influx corresponded with a solid number of new discoveries, peaking in 2007.

Post the GFC there has been a steady and quite precipitous decline in discoveries even though funding levels peaked later in 2012.

What is not well understood is the lag in the system. Many of the discoveries in the early-mid 2000's came from work done in the prior decade. Based on this, we should now be seeing a solid pipeline of early stage projects starting to emerge. We are not.

So clearly, something has gone wrong. The exploration spend is not translating into a steady stream of early stage discoveries. So why is this? The reasons are likely many and complex ranging from industry capability, land access challenges through to gaps in our targeting capabilities.

For mature exploration terrains like here in Australia, the challenge is to crack the code on exploring through post mineral cover. Even today with all the tools at our fingertips, we struggle to explore through even a few metres of post mineral cover. This needs to change.

## **Slide 8 – Industry consolidation had an impact, but it is now time for all to step up**

I have thought long and hard over the past few years as to why we see this ongoing decline in greenfield discoveries.

As I have already said, the reasons are complex. However, I do believe one of the reasons has been the ongoing consolidation across the industry.

Many of the great mining companies of the past were also very effective exploration companies. On the left of this slide we see a small selection of these companies. Many were serious explorers in their time and they often had very specific domain expertise either by region or by commodity. These companies were often founded upon a particular discovery and so exploration was completely imbued within their DNA. Western Mining perhaps more than any other company in Australia had that culture and was driven to succeed. These companies invested through the cycle, collected large regional datasets and so did a lot of the heavy lifting. They also invested heavily in their people and in research.

The industry consolidation through the 80's, 90's and into the early/mid 2000's saw the focus on early stage exploration start fall away. The new mid-tiers and super majors were driven to generate synergies from M&A or harvest opportunities in the orbit of their operations.

The downside is that slowly we saw fewer and fewer large regional exploration programs, an overall lowering of domain expertise and a reduction in professional development.

So just when life gets tough and we need to move beneath cover in the well-explored parts of the world, we find very few companies with the requisite finances and domain expertise to take this on.

In my view the industry as a whole needs to consider this issue as the headwinds to discovery success are now higher than ever.

## **Slide 9 – Analytics and technology enabled exploration strategy**

What we do understand is that astute use of technology will be key to tackling these headwinds.

As I like to say, that which is easy to find has been found, and so the next frontier of discoveries will require mining companies to think outside the box.

What we want to find are assets that are hiding in plain sight or, ideally, under shallow cover.

To do this, we have taken a more sophisticated approach to data – combining public data, proprietary data and advances in assessment techniques to identify new targets...in fact, many of our targets are in areas that have been well explored historically.

These days we also have a much greater ability to assess progress and guide our work in the field with new technology. Drones will be a big part of that story, and in combination with other technologies help us to more rapidly understand the underlying terrane.

We don't just rely on novel and market available technology either. We invest in R&D and we have and continue to develop our own proprietary tools and techniques to improve our ability to target exploration activities.

## **Slide 10 – Unlocking near surface discoveries through sophisticated analysis**

As we all know we have seen discoveries made at depth through time. These started to accelerate in the post war period as better geologic models, drilling techniques and geophysical methods started to come to the fore.

The challenge of course is it takes more to drill these discoveries out and typically we put more capital at risk to bring these deposits to market. So we do really need to focus on some of the very best deposits.

At Rio Tinto we have been targeting deposits under cover for quite some time. I was lucky to be a part of the team that helped make the Las Cruces copper discovery located in the South of Spain. The key ingredients in that discovery were excellent geologic thinking, a hunger to find regional datasets and a willingness to break the rules in terms of how to explore for VMS deposits in the Iberian Pyrite Belt and so used geophysical techniques in a very novel manner.

Over the past couple of decades we have actually made quite a large number of discoveries under cover and so feel increasingly comfortable in moving in this direction. That does not mean we are exclusively looking at depth. Clearly we would much prefer to find outcropping deposits, but in mature exploration environments or in areas of post mineral cover, one must move under that cover if you want to be in the race.

For us, we focus as much on direct detection methods as we do on understanding metal fertility and other signs that we may be within a mineralising system.

## **Slide 11 –Technology on show at FalCon**

One of our more advanced exploration projects is located in the Fort a la Corne diamond district in Canada. We call it FalCon and it's a project we're working on with the Star Diamond Corporation under an option agreement that could see us with 60% of this project if it goes ahead.

At FalCon, we're using a custom built modified Bauer trench cutter for sampling of the kimberlite pipe as previous drilling methods had resulted in the potential undersampling of diamonds or the breakage of larger stones. This is the first time a trench cutter like this has been used for this purpose. This is a great example of taking an innovative approach to technology development. However, as with all innovation, it has required a lot of trial and error and strong collaboration with our partners.

As you can see this is no small rig we are dealing with. Given the importance of recovering the large high quality diamonds, we had to go for something that could deliver very large samples to a depth of around 250 metres. This is truly a monster of a rig.

To date we have completed four trenches with the deepest reaching 249 metres. We are now assembling our bulk sampling plant on site.

The Fort a la Corne province is one of the most prolific kimberlite clusters known. However, it is overlain by a variable amount of postglacial till cover. Where these trenches are being cut the cover is averaging some 100 metres.

## **Slide 12 – Exploration success at Winu**

Another advanced project is our recent copper-gold discovery at Winu located in the Paterson region immediately north of the Pilbara. You may have read about this in recent months. It certainly seems to have attracted quite a lot of interest.

This discovery came about by applying new insights to improve our targeting techniques. This is one of those rare and exhilarating stories where the very first drill hole was the discovery hole.

It is still in the early stages and there is plenty more work to be done. We have an extensive drilling programme this year, with 12 drill rigs on site and a 190 person camp. We are also undertaking significant enabling works as well as cultural heritage, environmental and related studies to progress the permitting and approvals process.

I had the pleasure to visit the site around three weeks ago. It is great to see the energy and excitement on an exploration and evaluation site. Every hole is telling us something new and slowly we are pulling together the story of the Winu deposit.

As already stated we are encouraged by what we have seen so far.

## **Slide 13 - Focussed on defining the supergene zone - a possible starter case**

Last Thursday we published the latest set of drill hole results for Winu. The release provided new data on fourteen diamond drill holes and twenty-eight RC drill holes.

The results continue to indicate relatively wide intersections of vein style copper mineralisation associated with gold and silver beneath relatively shallow cover. The mineralisation remains open at depth and to the east, north, and south. Today, the defined strike length is approximately 2.1km roughly north-south.

As I said earlier, our Tier 1 assets of today didn't all start life that way. It is important with Winu that we look for a case that is bankable, relatively low capital and low risk. As such, we are primarily focussed at defining a potential open pit starter case. As such we are prioritising drilling into the supergene zone.

This project is not just all drilling. Technology will play a big part. We are hyperspectrally scanning all core and chips in the field to help us understand both the lithology and alteration and to assist in really nailing the mineralogy and metallurgy as soon as we can.

We have high expectations that we will be using machine learning and sophisticated mathematical models to help us optimise the recoveries from any final flowsheets.

## **Slide 14] – Closing remarks**

I hope today that I have given you some insight into Rio Tinto's global exploration activities globally, our discovery track record, the industry context as well as Rio Tinto's overall exploration strategy.

So a couple of final thoughts.

Firstly, the discovery challenge as we explore further 'under cover' is bigger than any single group, company or department. That which is easy to find has already been found. This means we need to be smart and deliberate about how we find the next great discoveries. We need to apply data and technology in both traditional and novel ways and continue to invest in R&D and in our people.

Secondly, we need to partner where it makes sense. We have completed deals with Antipa Minerals in Western Australia and Star Diamonds in Canada and today we have a large number of JV's and earn-ins underway around the world. We are actively seeking to do more with junior and mid-tier companies. Our door is firmly open.

So, if you have an opportunity you'd like to discuss, seek out the Rio Tinto Exploration team here in Kalgoorlie and start a conversation.

Happy hunting.