CHECK AGAINST DELIVERY

3DEXPERIENCE Forum

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Anglo American plc

"On the cusp: game-changing innovation in mining"

Intro: Why mining matters

Good morning everyone…

In 1859, just over 400 miles from Las Vegas, a major mineral discovery was made that both transformed the statehood and development of Nevada and had a significant impact on the development of San Francisco. This discovery, the great Comstock Lode, required technological innovation in the areas of mining, processing and sustainability to release its fabulous wealth. It's one of many examples where mining, with technology, has led the way in the development of nation-building infrastructure.

After watching the opening videos, I trust you have a good sense of how important mining is to all industries... of the far-reaching value generated by the commodities and precious metals and minerals we mine. The following words sum up mining's importance to the world: *If you can't grow it, there's a good chance you have to mine it!*

Without mining, our planet would not be sustainable. It would severely hinder our ability to generate sufficient electricity, develop technologies to support global communications, provide materials to build homes, build the transportation to get around, and feed our growing world.

Simply put, mining continues to be one of the world's most important industrial activities yet, contrary to popular belief, it has one of its smallest environmental footprints. Mining takes up less than 1% of the earth's surface and directly generates less than 3% of carbon gases while feeding into a whopping 45% of the global economy. It's the key source of products that clean the water we drink, clean the gases our cars emit and therefore the air we breathe. Minerals are also a main ingredient of the fertilisers that allow the world to be fed using half the landmass that would otherwise be needed.

But mining faces many critical challenges...

As the world population continues to grow – currently at 3% per year – so does the demand for commodities. As miners, the question that keeps us awake at night is how will we keep pace, especially when the challenges we face are increasingly complex?

We're in a race to deliver the minerals and metals required to meet the needs and aspirations of a steadily growing global population as well as a swelling middle class which, in China and India combined, is already approaching one billion people.

At the same time, consumer products require more minerals than ever. In the 1980s, it took just 11 minerals to manufacture a cell phone. Today it takes more than 60!

However, while there's an abundance of resources across commodities in the earth's crust, the resources that are quantified and that we can we can readily access are virtually all declining in grade and quality.

To provide the commodities and precious metals the world needs to prosper, miners have to search for minerals in increasingly far-flung and unfamiliar regions such as Africa's vast interior where significant amounts of key minerals are known to be. These 'frontier' mining jurisdictions hold unique challenges including difficulty of access, massive infrastructure and transport logistics needs, as well as a lack of skilled workers.

At the same time, the rising cost of extracting resources is putting a vice-like grip on margins.

The mining industry excels at doing infrastructure... but despite the fact that some of the world's most innovative companies, such as 3M, started out in mining... the mining industry leaves much to be desired when it comes to innovation. Yet serious innovation is exactly what our industry needs to solve its critical challenges. These challenges include...

- Declining grades of deposits for many minerals: For example, world copper grades declined from 4% in 1900 to just 1.07% in 2010. This, combined with the depletion of surface mining, is forcing us to mine at depth. However to be able to dig deeper, we need innovative technologies for securing workplace safety – sometimes at depths of 4 km with rock temperatures of 63 degrees Celsius.

- Mining's productivity is also on a steady decline. If we look at Australian mines, over the past decade energy use rose by 60% and productivity dropped by 40%, with a dramatic impact on costs. Since about 2007, the revenue-to-capital-employed ratio has been turning against miners. The only way to address this is with productivity-enhancing digital and mechanised technologies.

- Mining's operating models and technologies lag years behind the manufacturing, oil, chemical, automotive and aviation sectors. The last innovative breakthrough in mining took place 20 to 30 years ago, and simply scaling up current equipment will no longer work.

- Other hurdles include the rise of resource nationalism, growing demands from host countries in terms of physical and social infrastructure, and increasingly onerous permitting and licensing requirements due to community and NGO

activism... all of which can lead to significant project delays. We're also having to defer and scale back projects as we strive to meet the returns expected by our shareholders. All of this points to a tightening of supply.

- What's more, the mining industry is guilty of letting its capital projects get out of hand. It has become the industry norm to have capital overruns of 20 to 30%, with companies wasting billions of dollars at both the design and construction phases, and then destroying similar levels of value with the same projects not performing close to their design specification.

The mining industry urgently needs to get a grip on these challenges... and innovation is the key

In the face of such huge extraction challenges, the mining industry is grossly underspending on innovation and business-improvement programmes.

On a revenue-to-revenue basis, the mining industry spends 80% less on technology and innovation compared to the petroleum sector. This is an astounding figure, especially when our operating costs are increasing three times faster than consumer inflation rates and are on their way to doubling in less than five years.

With industry margins being squeezed on all fronts, we simply *have* to embrace innovation if we want to find more productive, efficient and sustainable ways of extracting value from the minerals we mine. In fact, mining needs to leap forward 20 years in the next five.

What's out there?

For the first time in my 36 year career in mining, I feel we're on the cusp of an explosion of game-changing technology. That explosion hinges on our willingness and ability to collaborate with a broad range of partners to embrace disruptive technologies and create win-win situations for all.

I look out there at opportunities such as lasers that can cut rock, medical imaging for real time sampling, big data and 3D printing to manufacture tailored equipment – all low-hanging fruit just within our grasp. I'll get back to that a little later.

Rethinking our approach to innovation

At Anglo American, we've been spending a lot of time thinking about how innovation can help our industry address its challenges. This means we've been rethinking our own approach to innovation. I'm proud to say that, today, there is a renewed commitment at Anglo American to bring innovation into our organisation.

This commitment is driving a new approach that reflects the tsunami of change under way in terms of how the most innovative people and organisations are innovating.

The truth is - no company can keep pace with today's advances on their own. That's why the traditional means of innovating are morphing into new approaches that are more collaborative, inclusive and horizontal. Approaches that bring together stakeholders with different perspectives to reframe challenges, produce rough prototypes to quickly test ideas and co-create user-centred solutions that can be adopted faster.

This more open and collaborative approach is completely aligned with our new vision and mission at Anglo American.

For us at Anglo American, it's not just about mining but rather about how we mine... about how we're going to innovate... at the heart of the answer to 'how' are new types of partnership and collaboration.

Don't get me wrong though... innovation isn't new to us. We were at the forefront of deep level, hard rock mining, and drove advances in platinum, gold and diamond processing.

What is new today is our approach to innovation. We call it **FutureSmart** and it marks the dawn of an exciting new era at Anglo American. FutureSmart is our response to the industry's global drive for a more sustainable approach to mining. It will accelerate our ability to use innovation and technology to address our critical challenges and find safer, more efficient, environmentally friendly and sustainable ways to unlock mineral value.

FutureSmart has our innovation engine firing on all cylinders. It captures our vision for a step change in our innovation processes. It's requiring us to take off our blinkers, look outwards and work with partners to create sustainable value that makes a real difference.

FutureSmart uses holistic, systems-first thinking. It guides us to look at the greater context of a potential technology and, from the outset, work closely with the people who will use it.

FutureSmart brings together a number of our value-creating initiatives that use innovation and technology as an enabler. It inspires us to reach out and bring in people with different skill sets and fresh perspectives from other industries.

As part of FutureSmart, we're spearheading Open Forums on Mining, Processing and Sustainability... working with diverse stakeholders, including our peers, research institutions and suppliers, to address global issues related to operational efficiency, energy, water and safety... and making the solutions available industry wide. At Anglo American, we'll derive our competitive advantage from putting our own unique stamp on how we leverage and integrate these technologies – not from ownership of intellectual property.

You'll hear more about FutureSmart and the Open Forums this afternoon during Donovan Waller's presentation which I hope many of you will be able to attend.

So things are changing at Anglo American...

Starting now, we're going to actively foster a corporate culture where leaders encourage, enable, measure and reward innovation across our organisation. We want all employees – not just those in our Technology group – to be thinking about how we can do things differently and better... to be having solution-focused conversations that improve lives in some way.

Prior to joining Anglo American, at AngloGold Ashanti, I experienced how integrated thinking and broad collaborative partnerships can significantly accelerate the idea-to-application cycle. We used an open-forum collaborative model to go from a desktop concept to operating prototypes in less than two years. Now we're looking at a potential practical operating model in less than four years. In the mining industry, that's lightning speed!

We've applied some of this thinking to our efforts to become more customer centric as we find better and more cost-effective uses for our products in diverse customer industries. As a result, we're seeing an extraordinary widening of applications in diamonds and our platinum group metals, while also generating greater value in our bulk commodities businesses by more closely tailoring iron-ore and coal products to specific customer requirements.

Learning from other industries

So many possibilities are out there that are ripe for the picking. It comes down to how we operationalise and bring them together into a complete system.

At Anglo American, we're making it our mission to learn how other industries are bringing innovative technologies into commercial practice. We'll take the best from these industries, such as Dassault Systèmes' 3DExperience platform and industry solution expertise, to improve our processes and help us shift from manual to automated mining, from wet to dry mineral extraction and from batch to continuous processes.

In my opinion, it's imperative that mining move very quickly to embrace some of the innovative technologies that are giving other industries a significant edge. One example is big data. Its analytic capabilities will give us fresh insight into our business that could have huge spinoffs in equipment maintenance, product optimisation, safety and human resources to name a few. Advances in laser, 3-D printing and mapping, instrumentation and robotics technologies also stand to drive efficiencies in our industry and propel it into the future.

We're excited about the potential of Dassault Systèmes' technologies to help us predict outcomes, control costs and unlock value in our industry. A lot of mining equipment, including vehicles, is already designed with Dassault Systèmes' software. At Anglo American, GEOVIA has been helping us understand, model and manage orebodies for several years now and we're currently exploring how 3DS can add further value for us.

Thanks to companies like Dassault Systèmes, we now have the opportunity to digitally design a complex piece of project engineering and test it digitally before we even put a shovel in the ground… a much cheaper and quicker route than, say, erecting a pilot plant. I believe there's a lot Anglo American and the wider industry can learn from an organisation that has helped many of the big companies we know today, become better companies.

A final word…

There's no doubt that the mining industry faces huge challenges. But none of them is insurmountable or too big for us to solve if we rethink our own models – perhaps by taking a page from the way we collaborate in research – and start helping each other close the technology gap to deliver step changes in cost and other performance metrics.

Along the way, we'll need to consign restrictive intellectual-property rights to the wastebasket... they are simply holding back our ability to innovate and change at the pace the world demands.

Today, mining is on the cusp of game-changing innovation that will move the industry forward in leaps and bounds. At Anglo American, we're determined not only to be ready for this innovation, but to lead the way in creating it.

It's clear to me that sharpening our innovation edge is no longer optional... it's a must. Ramping up our innovation game will not only drive efficiencies and enhance returns, it will enable us to generate the kind of value that makes a real difference to real people around the world.

Thank you.