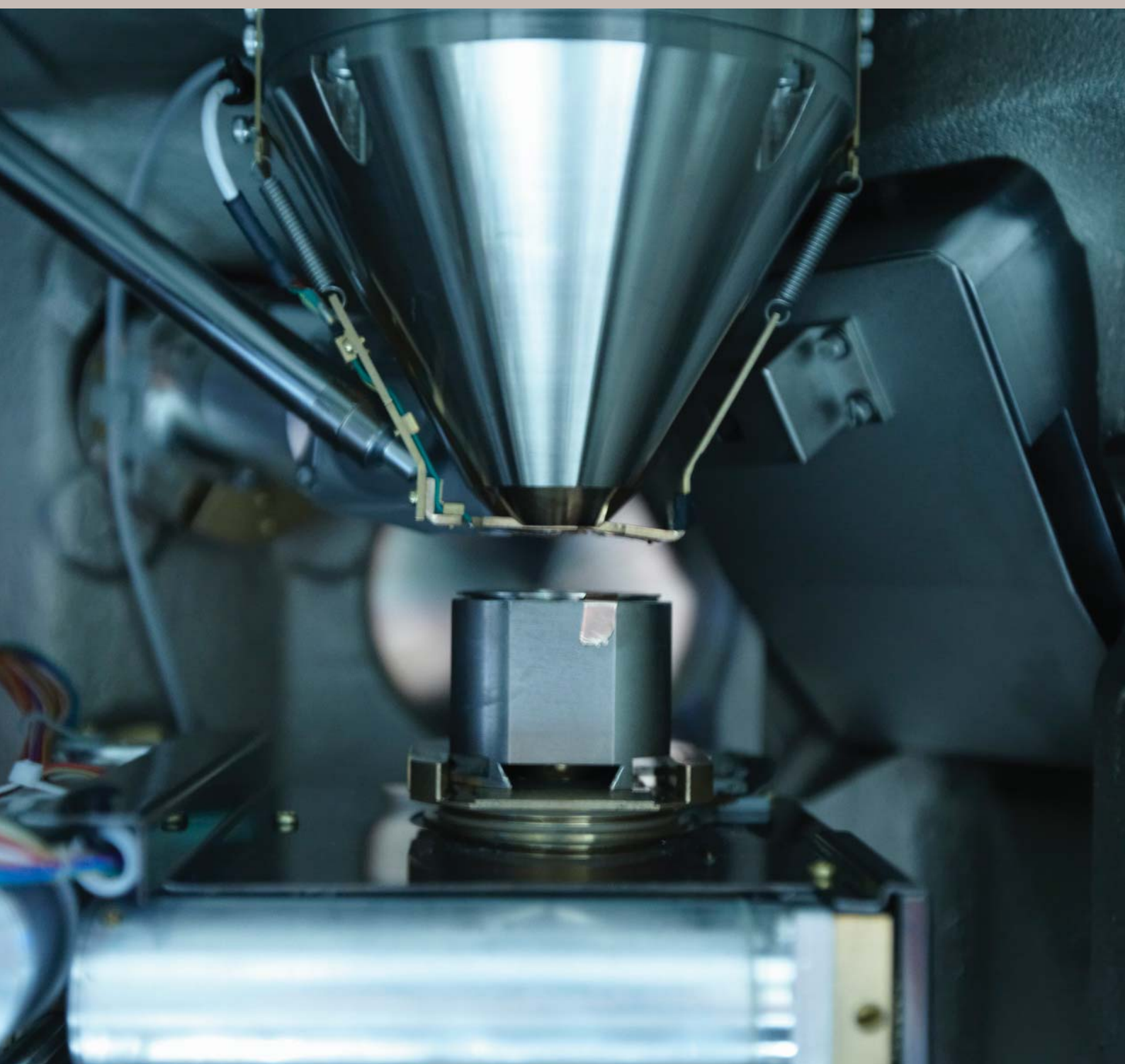


Fact sheet

Technology and innovation

RioTinto





Technology and innovation in Rio Tinto

Rio Tinto is a leading international business involved in each stage of metal and mineral production. The Group combines Rio Tinto plc, which is listed on the London Stock Exchange, and Rio Tinto Limited, which is listed on the Australian Securities Exchange.

We aim to have the best mining and processing technology available, and to innovate new ways of operating that will benefit our business, employees, customers and shareholders. We are devising new technologies that minimise our impact on the environment, and improve the health, safety, and working conditions of our people.

The Technology & Innovation (T&I) group provides world class technology services to Rio Tinto's product groups and businesses. It also advises Rio Tinto's executive management. T&I is made up of technology centres that identify, share and implement leading practice across Rio Tinto. The centres each have responsibility for different areas of mine technology, which include mining, asset management, strategic production planning, processing, project development and technical risk evaluation of investment opportunities.

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We pursue step change innovations in mining and technology, such as our remotely operated, driverless haul trucks.

The various elements of T&I collaborate in capturing knowledge and spreading it through Rio Tinto. T&I identifies and promotes leading practice in operational technology. It also pursues step change innovations that will provide Rio Tinto with further competitive advantages as it develops the orebodies of the future.

We have the experience, know how and capability to be a key innovator in the mining industry, and the vision to be a world leader in technological development. We work to develop and implement new processes, technologies and tools that will bring the mine of the future into the present.

Technology trends

Technology is an increasingly important success factor in the metal and mineral industry. Improvements in technology can change the way that we look at mineral deposits. Orebodies that at one time would have been uneconomic to exploit – due to their grade or their location – may become economic prospects with the help of new technologies.

Technical challenges for the mining industry are likely to become more complex, as companies pursue opportunities in new mining territories, while managing costs and responding to environmental imperatives in a carbon constrained world.

The large scale surface operations of the past will need to give way to greater use of underground techniques, such as block caving, which uses less energy and creates less disturbance at ground level.

New processing techniques may make it possible to extract minerals from the ore in situ, without bringing huge amounts of rock to the surface, again saving energy.

Mining increasingly takes place in remote parts of the world, where it's hard to recruit the necessary staff expertise. So the mines of the future are likely to rely on remote monitoring and control, with employees running the mines from cities thousands of kilometres away.

We're already making these visions a reality with our Operations Centre in metropolitan Perth. From here, we intend to remotely manage the automated operation of our iron ore mines in Australia's Pilbara region, some 1,500km away.

Our own technology professionals are working with some of the best academic minds to achieve our goals, through partnerships with leading institutions such as the University of Sydney and Imperial College London.

We know that the time to start innovating for tomorrow's mines is today.

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We work in partnership with leading academic institutions like Imperial College London and the University of Sydney.



Our activities

T&I creates value for Rio Tinto businesses in several ways.

- We support them as they implement leading practice in their operations
- We support them as they develop high value projects
- We develop and implement innovative technologies that they can use
- We evaluate the technical risk of their projects
- We devise measures that they can use to analyse their effectiveness in the areas we cover
- We help develop employees' capabilities.

Our core team of technology professionals and technology centres develop leading practice and drive sustainable improvement in six areas, described here.

Top right
The Technology & Innovation group supports Rio Tinto's businesses in implementing leading practice.

Right
We've started an operations centre in Perth to direct operations some 1,500 km from our mines.

Innovation

The Innovation Centre is driving step change innovation for Rio Tinto over the next five to ten years, in the areas of mining, processing and energy.

Some of our work is in developing block cave mining and rapid tunnel development technologies – which allows us to extract ore from large orebodies without having to dig an open pit at the surface. Block caving is an efficient technique because it uses gravity to extract ore; the blocks of ore fall, under their own weight, into caves created underneath them.

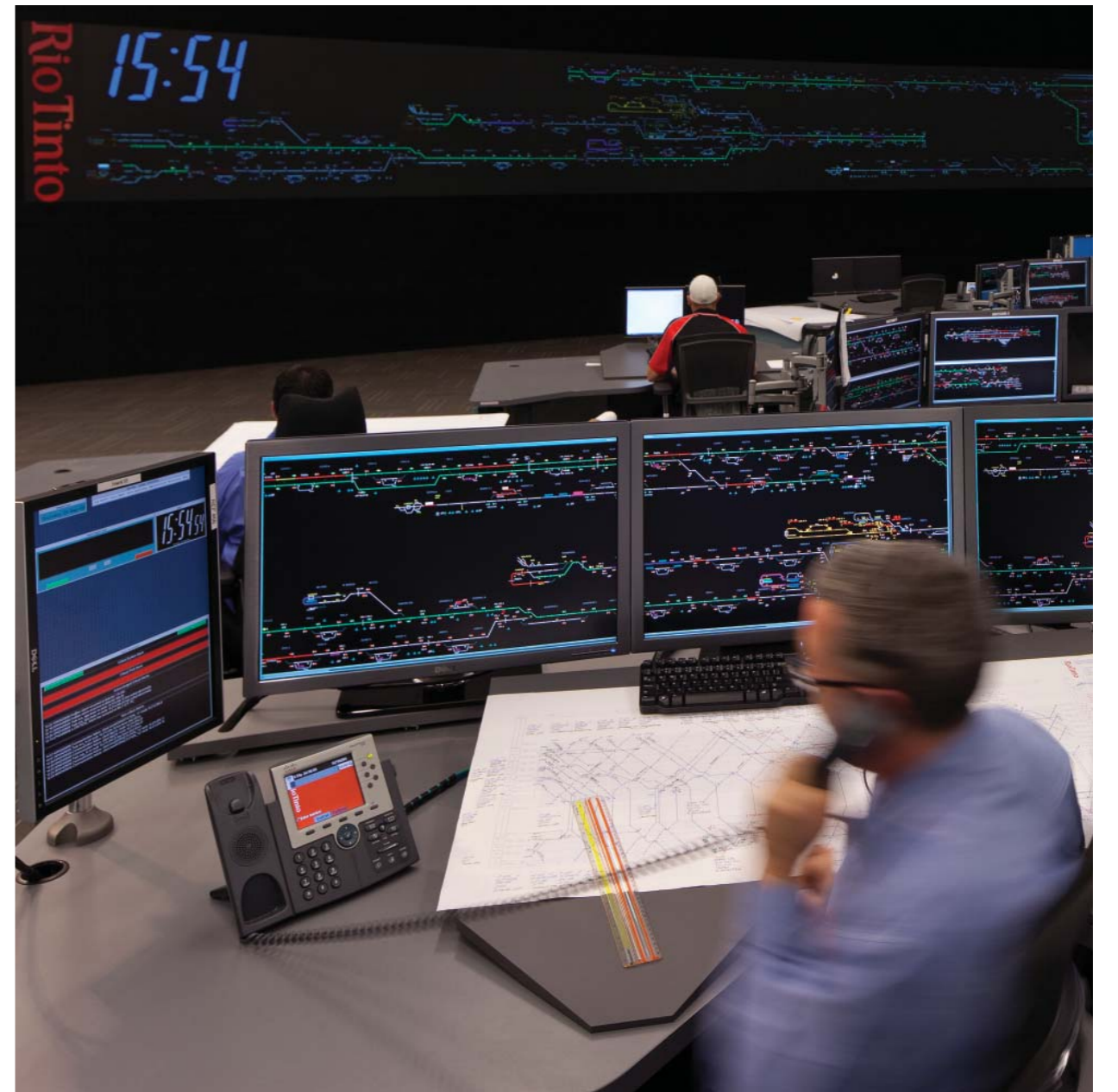
Our other major projects include remote monitoring in underground mining; in-pit material sizing and conveying; process advances in ore sorting and pulverising; and enhancing metal extraction in heap leach processes.

Another of our key aims is to help make Rio Tinto's vision for the "Mine of the Future™" a reality. T&I has started working towards this vision in partnership with Rio Tinto Iron Ore, in the Pilbara, Western Australia. We are aiming to demonstrate better ways of mining through automation and remote operation. We've started an Operations Centre in Perth to direct operations some 1,500km from our mines. This Centre will direct remote controlled haul trucks and drills to extract our ore and driverless trains to carry it to port.

These steps, and others, will let us reduce our footprint and operating costs and allow us to be more efficient. The Mine of the Future™ won't mean fewer jobs, just different, more highly specialised jobs, which will also bring more flexible working conditions for our staff.

Rio Tinto is leading the way in the development of mine automation. We are the first mining company to attempt automating the total production operation, and to manage it remotely.

Rio Tinto recognises the value of intellectual property and actively promotes its development and protection for the wider benefit of the Group. Responsibility for management of Rio Tinto's intellectual property sits within T&I's Innovation Centre. Management of the Group Intellectual Property portfolio is conducted centrally.



Mining Technology

The focus of the Mining Technology Centre is to establish leading practice and develop Group wide solutions in the core mining production processes of surface mining, underground mining, strategic resource development, resource and reserves estimation, orebody knowledge and mine planning, and make sure that these are shared and implemented around the Group. We help develop the skills of Rio Tinto employees who are involved in these processes.

The Centre also includes a Strategic Production Planning (SPP) team that works with business units to develop comprehensive plans and valuations of strategic development options. While this work is strongly driven by the nature of reserves and resources in the ground, the production and economic models must include all elements of the value chain, from mining and processing to sales and marketing, over the potential life of the business. Results from SPP provide a logical resource development framework for more detailed studies and investment decision making.

Asset Management

The Asset Management Centre's role is to establish and implement global asset management strategies and programmes aimed at improving the performance and reliability of our physical assets. These assets include both fixed equipment in processing plants and heavy mobile equipment, such as trucks and shovels. We work in partnership with business units to implement these strategies and improvement programmes.

We implement metrics and standards throughout the Group designed to monitor and improve performance and increase the reliability and life of our equipment. We support the development of our employees through a number of professional training programmes and sponsor a number of collaborative forums to promote the sharing of leading practice.

We also determine the standard technical systems to be used across the Group as part of Rio Tinto's Global Operating Model. These include real time online equipment monitoring systems which have led to improvement in heavy mobile equipment availability and economic extension of engine and component life.

Energy & Climate Strategy

The Energy & Climate Strategy team was established in 2008 to lead Rio Tinto's response to the challenges of climate change. The key activities of the team are economic analysis around energy and carbon markets, engagement with governments and other stakeholders on the design of climate policy, the development of internal strategies to reduce energy usage and greenhouse gas emissions, and the identification of low carbon pathways for the Group's products.

Through the Energy & Climate Strategy team, Rio Tinto actively supports the development of legislation through direct engagement with governments and involvement in advocacy groups such as the US Climate Action Partnership. The team also supports the business units in preparing for future emissions trading systems and manages the Group's work on carbon capture and storage.

The Energy & Climate Strategy team is developing internal strategies to manage climate change risk. This work includes the development and implementation of increasingly sophisticated valuation and risk analysis techniques around carbon and energy exposures, and the identification of technical solutions to reduce the Group's energy usage and emissions.

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Rio Tinto has the experience, know how and capability to be a key innovator in the mining industry.



Project Development and Implementation

Project Development and Implementation (PDI) is the centralised group responsible for partnering with the business's product groups and business units to deliver major capital projects.

PDI consists of a Project Management Office (PMO) and Project Delivery Hubs.

The PMO is responsible for developing, delivering, promoting and governing the standards and tools for projects in order to achieve repeatable success.

The Project Delivery Hubs are responsible for managing and delivering new business and assets for Rio Tinto.

Technical Risk Evaluation

The Technical Risk Evaluation Centre ensures that Rio Tinto's investment decisions are based on independent, thorough technical review and evaluation. We ensure that Rio Tinto's technical standards are upheld during the investment development and review process.

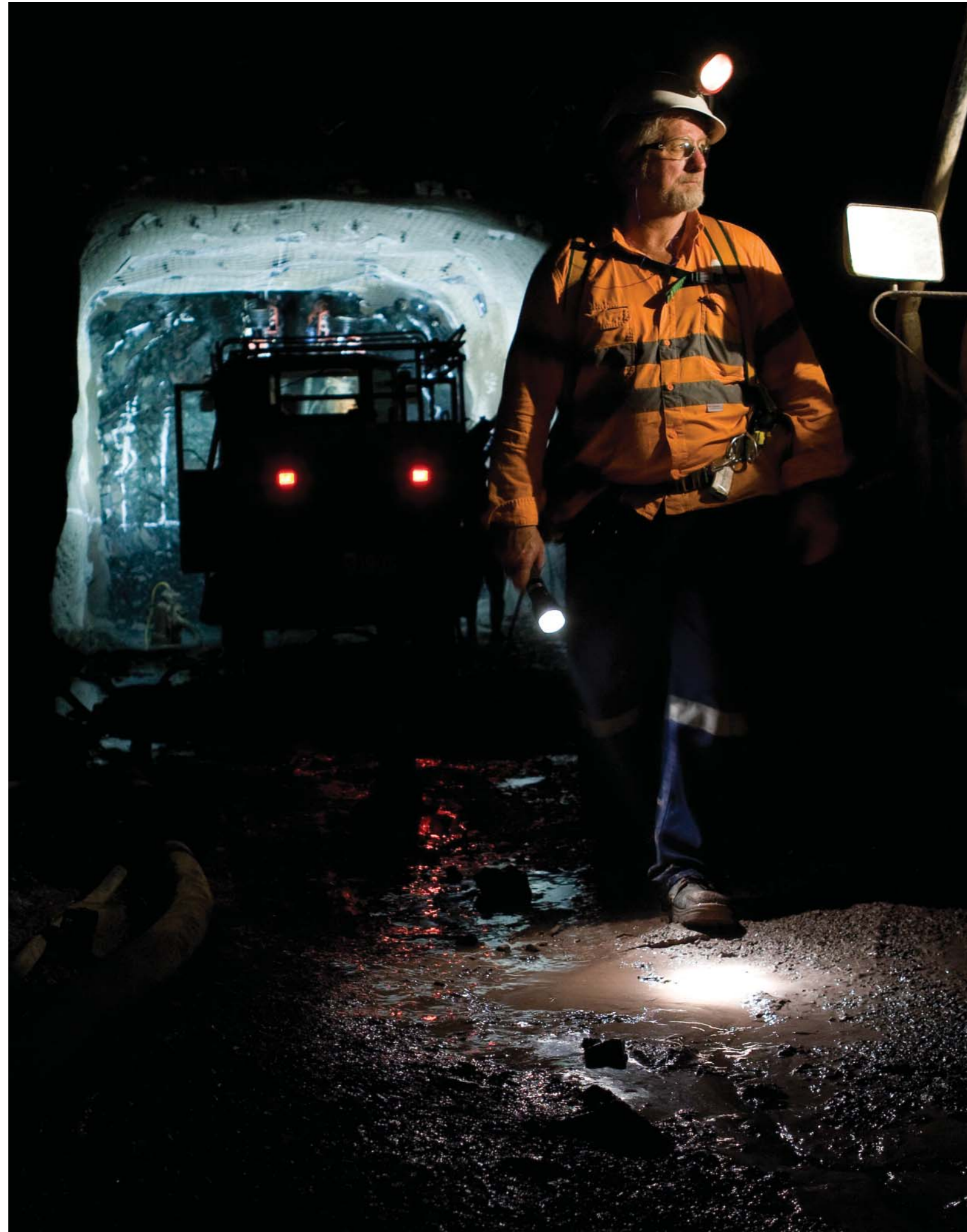
The Risk Competence Centre has established a leading practice design for the risk process across the Group. Implementation of the process, termed the "Rio Tinto approach to risk analysis and management", is underway. It is supported by a Group wide risk data system named RioRisk, which is being deployed progressively across the business. Other infrastructure elements that support the risk process include REGIS (Risk Electronic Guidance and Information System), the Risk Forum, and a growing network of risk champions located in each business, project and function. Continued progress with this work will help ensure that the Group understands, manages and reports its risk effectively.

Mineral Technology Services

The Mineral Technology Services Centre is a team of technology professionals based in six offices in North America, Australia and the UK, who we use to partner with Rio Tinto's business units in delivery of large, measureable increases in earnings and value. We provide technical service to Rio Tinto's business units in the areas of geology, mining, mineral processing, geotechnics, hydrometallurgy, process control and the environment. We also work to increase the technological excellence and capability within the Group.

The Centre is also focused on establishing leading practice in the areas of processing methodologies and metallurgical technologies, which include methods to identify, understand and reduce product losses that occur during mineral processing.

Right
We are developing an underground block cave mine under the open pit at Argyle diamond mine, Australia.



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Exploration

Rio Tinto plc
2 Eastbourne Terrace
London W2 6LG
United Kingdom

T +44 (0)20 7781 2000

Rio Tinto Limited
120 Collins Street
Melbourne, Victoria 3000
Australia

T +61 (0)3 9283 3333

www.riotinto.com