

Exploration group

STRATEGIC OVERVIEW

The purpose of exploration is to increase the value of the Group by discovering or acquiring resources that can augment future cash flows.

Adding value to a Group the size of Rio Tinto effectively means that exploration programmes must regularly return what others might call “company maker” discoveries. These are the largest and highest quality mineral deposits that the natural world has to offer, called Tier 1 resources.

Exploration involves the identification, prioritisation and testing of geological targets. As less than 0.1 per cent of targets will actually deliver a discovery, a continuous flow of opportunities is required. Exploration success in Rio Tinto is defined as the discovery of a deposit that warrants detailed economic evaluation. Handover of the deposit to a product group evaluation team marks the end of the exploration phase.

Greenfield exploration, which aims to establish new mineral businesses, involves geographic or commodity diversification away from existing Rio Tinto operations. Accountability for greenfield work lies with Rio Tinto Exploration (RTX).

RTX is organised into regional multi-commodity teams. This gives the group local presence, an in depth understanding of the operating environment and a holistic view of geological terrains. At the same time, programmes are prioritised on a global basis so that only the best opportunities are pursued.

There are currently five of these regional teams, which are supplemented by the Project Generation Group (PGG). PGG provides specialist commercial, technical and generative assistance and also co-ordinates all RTX research and development activities.

At the end of 2007, RTX was actively exploring in 30 countries and assessing opportunities in a further 20 for a broad range of commodities including bauxite, copper, coking coal, iron ore, industrial minerals, diamonds, nickel and uranium. RTX employs about 250 geoscientists around the world and has a total complement of approximately 950 people.

Brownfield exploration is directed at sustaining or expanding the value of existing Rio Tinto business units. Given that resources are the lifeblood of every mining operation, this is an essential business activity. Accountability for brownfield programmes lies with the business units, with RTX providing technical assistance.

The brownfield environment provides the easiest opportunity for creating value through exploration. The reasons for this are clear – Rio Tinto controls highly prospective title around its existing operations and infrastructure, and economic thresholds are lower than in a greenfield setting. Moreover, Tier 1 resources – the giants of the mineral deposit world – tend to be found in clusters.

2007 OPERATING PERFORMANCE

Two greenfield discoveries, the Chapudi thermal coal deposit in South Africa and the Kintyre uranium deposit in Western Australia, were transferred from RTX to product group evaluation teams. Kintyre is now being offered for sale. One Tier 1 brownfield discovery, the Caliwingina North channel iron deposit, was transferred to Pilbara Iron.

Order of magnitude studies continued at the Bunder project (diamonds, India) and commenced at the Chilubane and Mutamba (ilmenite, Mozambique), Jarandol and Jadar (borates, Serbia) deposits. All are scheduled for completion in early to mid 2008. Negotiations continued with the Government of Indonesia on the Contract of Work for the Sulawesi nickel project.

Significant progress at early stage RTX projects in Australia (zircon), Brazil (bauxite), Canada (potash), Colombia (bauxite) and the US (nickel) is expected to lead to commencement of new order of magnitude studies in the second half of 2008. Several other projects are showing early signs of encouragement and could be fast tracked into this stage.

Exploration by the La Granja (Peru) evaluation team returned significant encouragement with the discovery of four new bodies of porphyry copper mineralisation. At the Bingham Canyon (US) copper mine, a substantial molybdenum deposit was identified located

beneath the copper orebody. Adding to this discovery, which is still being delineated by deep drilling, was the recognition of new porphyry copper mineralisation beneath the southern pit wall. These two new zones of mineralisation point to further discovery potential.

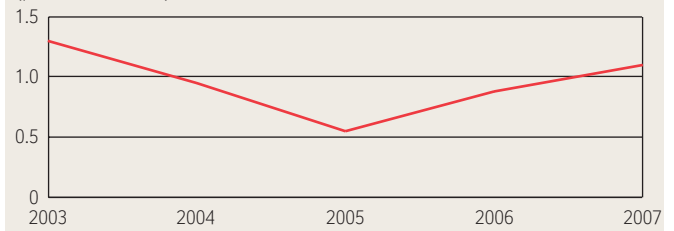
On Freeport Block A in West Papua (Indonesia), drilling encountered a new zone of copper-gold skarn mineralisation at the Gap target located between the Grasberg and Ertsberg intrusions. Delineation drilling will be conducted from an exploration drift in 2008.

On the Heruga concession of Entrée Gold near Oyu Tolgoi (Mongolia), operator Ivanhoe Mines announced discovery of the Heruga porphyry copper-gold deposit. Drill intersections included 454 metres at 0.50 per cent copper, 1.43 grams per tonne of gold, and 0.02 per cent molybdenum.

Near the Eagle deposit (US), drilling by the evaluation team intersected high grade nickel-copper sulphide mineralisation at three satellite prospects. Delineation drilling is planned for 2008.

At Energy Resources of Australia, the exploration and evaluation programme focused on infill drilling to support the previously announced mine extension, as well as the prefeasibility study into a further mine expansion. In 2008, attention will return to defining the Ranger 3 Deeps deposit.

All injury frequency rate 2003 – 2007
(per 200,000 hours)



FINANCIAL PERFORMANCE 2007 compared with 2006

“Exploration” expenditures reported by Rio Tinto include exploration and evaluation spends in both the greenfield and brownfield environments. Expenditure on brownfield projects reported separately in this *Annual report* by each of the Rio Tinto product groups is included in this summary.

Net cash expenditure on exploration in 2007 was US\$576 million, an increase of US\$231 million over 2006. This primarily reflects the large number of high quality projects in the exploration and evaluation pipeline, net of US\$197 million cash proceeds from the sale of the Peñasquito royalty, shares in Anatolia Minerals, the Southdown iron ore deposit and various other interests during 2007. The pre-tax charge to underlying earnings of US\$321 million is net of US\$253 million of total proceeds from the divestments mentioned above.

2006 compared with 2005

Net cash expenditure on exploration in 2006 was US\$345 million, a US\$81 million increase over 2005, reflecting an increase in the number of high quality projects in the exploration and evaluation pipeline, net of US\$23 million cash proceeds from the sale of various interests, including Ashton Canada shares. The pre tax charge to underlying earnings in 2006 was US\$237 million net of US\$46 million of total proceeds from divestments.

Exploration drill rigs at Rio Tinto's greenfields iron ore discovery at Simandou, eastern Guinea, Africa.



Discoveries

(Projects transferred to product group evaluation teams)

Year	Tier 1 discoveries	Tier 2 discoveries	Year	Tier 1 discoveries	Tier 2 discoveries
2000	Potasio Rio Colorado (potash)	Kazan (trona)	2005	La Granja (copper); Caliwingina (iron ore)	Rio Grande (borates); four Pilbara deposits (iron ore)
2001	0	0	2006	0	0
2002	Resolution (copper)		2007	Caliwingina North (iron ore)	Chapudi (coal); Kintyre (uranium)
2003	0	Sari Gunay (gold)			
2004	Simandou (iron ore)	Eagle (nickel)			

Definitions

Tier 1 Large, high quality deposits – the 20 per cent of deposits contributing 80 per cent of global production.
 Tier 2 Smaller or lower quality deposits – the 80 per cent of deposits contributing 20 per cent of global production.

Technology and Innovation group

The Technology and Innovation group (T&I) had its origin in the combination of the Operational and Technical Excellence (OTX) organisation and the Group's *Improving performance together* business improvement work in the areas of mining, processing, asset management and strategic production planning.

T&I's focus is to be a partner in value delivery with Rio Tinto businesses by:

- supporting implementation of leading practice and high value projects;
- developing and implementing strategic innovation technologies; and
- evaluating the technical risk of major capital and growth projects.

The group comprises a core team of technology professionals and a number of technology centres that develop leading practice and drive sustainable improvement in the areas of health, safety and environment (HSE), mining, processing, asset management, strategic production planning, and project development and evaluation. Key elements are common and visible measures of operational effectiveness, the improvement of analytical tools and enhanced functional development of staff capability.

A further centre focuses on step change innovation to confer competitive advantage in development of orebodies likely to be available to Rio Tinto in the future.

The total staff in T&I at year end was 387, compared with 368 at year end 2006. The increase was due to the higher level of growth activity characterising the resource sector.

2007 OPERATING PERFORMANCE

Health, Safety and Environment

The HSE Centre ensures that strategies and standards are in place to minimise HSE risk and drive performance. Activities support their implementation in the businesses and report results and performance trends to the board.

Specific activities during 2007 included embedding the environmental standards and metrics within business units, to complement the health and safety standards. The safety strategy was reviewed to concentrate on safety leadership, culture and measurement, and recognition of performance. This places Rio Tinto as an industry leader in terms of performance in these areas. Implementing the product stewardship strategy via business systems has benefited market access and competitive advantage. Continued development of the HSEQ management systems and the integration of the Alcan business were also priorities for HSE.

Innovation

The Innovation Centre is designed to drive step change innovation for Rio Tinto in the five to ten year time frame. The relevant technologies are in mining, processing and energy.

The activities in 2007 continued to focus on the block cave mining method of particular relevance to the large copper orebodies currently under development, remote monitoring in underground mining, in pit material sizing and conveying, data fusion in surface mining, process advances in ore sorting and comminution and modelling of heap leaching processes to enhance metal extraction.

A significant commitment by Rio Tinto to automation has culminated in a strategic partnership with the Australian Centre for Field Robotics (ACFR) at the University of Sydney. This exclusive partnership leverages an early mover advantage with Komatsu on driverless haul trucks and is a natural extension of other activity which will see the first fully integrated, autonomous mine in operation in the Pilbara in 2010.

Mining

The Mining Technology Centre addresses the core mine production processes. Specific activities in this area during 2007 focused on continuing to establish and disseminate leading practice in orebody knowledge, payload management in surface mining and reconciliation processes across the operations. Attention was also

given to further improving Rio Tinto's technical capability in rapid underground development and block cave design.

Processing

The Processing Technology Centre focuses on core metallurgical capability and delivery of processing operations. Specific activities in this area during 2007 focused on the implementation of a structured methodology designed to identify specific points of loss (throughput, recovery, and grade), understanding underlying causes behind the losses, and the development of projects to reduce or eliminate those losses across the Group's processing operations. A key enabling activity around the use of Processing Global Metrics for fixed plants was introduced.

Asset Management

The Asset Management Centre focuses on the effective choice and deployment of the Group's asset base in mining and processing. Activities in 2007 focused on the continued reliability and performance of physical assets across the Group, including the implementation of standards and internal "league tables" for maintenance of heavy mobile equipment such as trucks and shovels. This led to continued significant improvement in areas such as tyre life (a further five per cent added to the success of previous years), truck utilisation and economic extension of engine and component life. The centre also extended the range of its influence in 2007 to the reliability and performance of fixed plant assets across the Group.

Strategic Production Planning

The Strategic Production Planning Centre focuses mainly on a Group wide methodology to ensure orebodies are developed in the optimum sequence for the generation of maximum value. Specific attention is directed to the enhancement of the functional skill of planning staff and to regular review of the life of mine plans for all the Group's mining operations.

Project Development and Evaluation

The Project Development and Evaluation Centre is the proponent of standards and guidelines for all aspects of capital projects, from pre-feasibility through to execution and commissioning. This covers major projects as well as minor projects implemented within business units. It holds a body of expertise to ensure the lessons from previous project developments are a resource to the project directors for the next generation of development.

With its staff deliberately excluded from involvement in the formulation of major investment proposals, the Evaluation team provides independent review and advice on the adequacy of risk identification and mitigation at key points in the approvals process. The team is also responsible for overseeing the resource and reserve estimation within the Group.

Energy and climate change

The Group Chief Scientist monitors emerging global technology trends and identifies opportunities which could significantly enhance the Group's operations. Particular attention is given towards technologies with the potential for step change reductions in the Group's energy and greenhouse gas footprint. The Group Chief Scientist also assists product groups in positioning new and existing operations for reduced energy consumption, greenhouse gas emissions and energy costs.

Production Technology Services

Production Technology Services is the core team of technology professionals deployed across five global offices who provide the breadth of experience and multi disciplinary approach to support existing business activity and pursuit of new, profitable growth. They are deployed at the request of business units and the technology centres within T&I. Their offices are in Melbourne, Brisbane, Perth, Salt Lake City and Montreal. In addition, some staff reside in London to be readily accessible to the UK headquarters.