

**RioTinto**

**Rössing Uranium Limited**  
Working for Namibia

**Report to stakeholders 2016**

**Taking the long-term view**



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## The purpose of this report

This report aims to give readers an overview of the activities of Rössing Uranium Limited (Rössing Uranium) from January to December 2016, including our interaction with society, the economy and the environment.

Although the Rio Tinto Group is the majority shareholder of Rössing Uranium, it is not the only stakeholder that has invested in the business. All individuals and institutions that influence and are affected by the company are stakeholders, including the mine's employees and contractors; the communities of Arandis, Swakopmund and Walvis Bay; Government of Namibia institutions; service providers; and the mine's customers.

The report offers locally relevant information about our business and about issues raised during the year. We believe in open communication and transparency, and simultaneously instil a culture of sustainable development throughout our company.

**We would appreciate your feedback on this report. You can send us a text message to +264 81 143 3627; an e-mail to [RUL.communications@riotinto.com](mailto:RUL.communications@riotinto.com); contact us via our website at [www.rossing.com](http://www.rossing.com); or phone us on +264 64 520 9111.**

*(Front page photograph) Uranium-bearing ore is delivered to the Primary crushers and then by conveyor to the Coarse ore stockpile.*

*(Right) Rössing Uranium's Open pit, where heavy mining equipment can be seen in operation.*







# The Rössing Uranium mine

**Uranium was discovered in the Namib Desert in 1928, but it was not until intensive exploration in the late 1950s that much interest was shown in the area. After discovering numerous uranium occurrences, Rio Tinto secured the rights to the low-grade Rössing deposit in 1966. Ten years later, in 1976, Rössing Uranium, Namibia's first commercial uranium mine, began operating and celebrated its 40<sup>th</sup> year of production in 2016.**

Today, Namibia has two significant uranium mines, which together provide just more than 5 per cent of the world's uranium oxide mining output; Rössing Uranium produces about 2.5 per cent of the world's output.

The mine has a nameplate capacity of 4,500 tonnes of uranium per year and, by the end of 2016, had supplied a total of 130,500 tonnes of uranium oxide to the world.

The mine is located 12 km from the town of Arandis, which lies 70 km inland from the coastal town of Swakopmund in Namibia's Erongo Region. Walvis Bay, Namibia's only deep-water harbour, is located 30 km south of Swakopmund.

The mining operation is located in a hyper-arid environment. Insolation at Rössing Uranium is high,





(Left) Map of the Erongo Region indicating the location of the Rössing Uranium mine.

● Town ● Uranium Mine — Main road — Trunk road — River — Railway — Protected Area — Region



and as a result, daytime temperatures ranges are wide, especially during May and September, when the difference between minimum and maximum temperatures exceeds 20°C daily.

The lowest temperature is normally recorded during August, but frost is rare. The highest temperature is normally recorded in the late summer, particularly in March.

The mine site encompasses a mining licence and accessory works areas of about 180 km<sup>2</sup>, of which 25 km<sup>2</sup> is used for mining, waste disposal and processing.

Mining is done by blasting, loading and hauling from the main Open pit, referred to as the *SJ Pit*, before the uranium-bearing rock is processed to produce uranium oxide. The Open pit currently measures 3 km by 1.5 km, and is 390 m deep.

Our partnerships and stakeholders include individual citizens and their communities as well as non-governmental organisations, small-scale enterprises and multinational corporations. Thus, the benefits of our operations are felt locally, nationally, across the African continent and internationally.

(Left) The mine is located in a hyper-arid environment. We continue to monitor the vegetation and water levels in the Khan River to prevent over-abstraction.

## Shareholding

Rio Tinto owns the majority of shares (69 per cent) in Rössing Uranium Limited.

The Namibian Government has a 3 per cent shareholding, and it has the majority (51 per cent) when it comes to voting rights. The Iranian Foreign Investment Company (IFIC) is a passive legacy investor in Rössing Uranium, holding a 15 per cent stake that goes back to the early 1970s in the financing of the mine.

The Industrial Development Corporation of South Africa owns 10 per cent, while local individual shareholders own a combined 3 per cent shareholding.

The shareholders do not have uranium product offtake rights.

In 2016, the Rio Tinto Group employed 51,000 people world-wide, including the Group's share of joint ventures and associates. Of these, approximately 28,000 were located in Australasia, 13,000 in North America, 2,000 in Central and South America; 6,000 in Africa, and 2,000 in Europe.



# Message from the managing director

**Welcome to Rössing Uranium's Report to stakeholders 2016. Thank you for your interest in our mining activities. This report explains our business and the approach we take in what we do. It also outlines how we performed in the previous year as measured against our key drivers.**

In the year 2016 we went through many changes, and often under less-than-favourable circumstances. But we also achieved a lot.

Two important milestones that distinguished this year were, of course, our 40<sup>th</sup> anniversary of production, and the visit of His Excellency, President Hage G Geingob to the mine. Not many companies can boast that they received visits from all three of our country's presidents at their place of operation. At Rössing Uranium we are honoured to be able to do that.

Following on 2015 that was a challenging year for the uranium mining industry, 2016 certainly stretched our resilience and determination to survive.

In international commodity circles, 2016 is widely labelled the worst year of the past decade for the uranium industry: the spot price fell 50 per cent between January and November, at one point even hitting below US\$20 per pound. To put that depreciation into perspective, the break-even cost for most uranium mines is estimated at between US\$40 and US\$50 per pound.

Rio Tinto's marketing strategy of entering into long-term contracts with clients certainly played a role in minimising our operational losses during 2016. The long-term price indicator also fell, but less sharply: from US\$44 at the beginning of the year to US\$32 at year's end.

Increased production – we produced 1,850 tonnes of uranium oxide compared with 1,245 tonnes in 2015 – helped to counter the effects of the lower price on our cash flow.

Revenue increased by 67 per cent compared to the previous year due to higher sales volumes as result of the return to continued operations late in 2015.

This, together with the exchange rate that was in our favour most of the year, had a positive impact and we realised a net profit from normal operations of N\$107 million compared with a N\$385 million net loss the previous year.

Higher production volumes mean little if we cannot work safely and our people can't return home each day without injury. For that reason, safety will remain our highest priority.

We are grateful that we can report a reduction in our lost-day injuries from seven in 2015 to five in 2016 and our potential fatal incidents from ten in 2015 to seven in 2016. Disappointingly, however, our All-injury frequency rate deteriorated to 0.82 against a target of 0.68.

During 2017 we will stay focused on preventing fatalities by further embedding our Critical risk management (CRM) programme and will increase our drive towards ensuring all our people stay safe.

Without a strong leadership team, the Rössing Uranium 'ship' will not weather the current storms. Throughout 2016 we invested a lot of energy and resources strengthening the leadership skills of frontline supervisors.

A total of 64 supervisors went through the Management essentials for supervisors programme. In 2017 we will continue to develop staff talent and recruit the people necessary to make our team as strong as possible.

At Rössing Uranium, we place a high premium on the diversity of our workforce, as inclusion and workplace diversity improves employee morale and the motivation to work effectively and efficiently. Our leadership team is now 43 per cent female, a figure we believe is unchallenged in Namibia's mining

# Executive committee

industry. We are proud to hold a leading position in Rio Tinto in this regard.

A focus area in 2016 was the introduction of an integrated productivity model to meet production targets and to support cash-income generation. Although impressive progress was made during the year, we did not achieve all our production targets. We are aware that our margin for error and non-performance is very small.

Looking forward, the year 2017 will be a defining one in our history and we will be remembered for the trail we are now blazing. Commensurate with our expectations, the next few years will be challenging. However, we have worked through challenging times before and over the past 40 years, we have survived. If we achieve our production and cost targets, our business will remain feasible over the short term.

Our aspirations for 2017 are a fatality-free Rössing Uranium mine with an engaged and empowered workforce. We will continue to improve our safety foundation, as our primary priorities remain to prevent harm to our people and the environment, whilst staying profitable.

Every year, as part of our continuous improvement focus, we set demanding goals for ourselves for the efficient use of water, and water conservation measures at the mine are taken seriously.

Working smarter and harder, we are confident that we will not only survive, but thrive in the long term.

**Werner Duvenhage**  
**Managing director**  
 24 April 2017

**Werner Duvenhage**  
 Managing director



**Shaan van Schalkwyk**  
 Chief financial officer



**Leah von Hagen**  
 General manager,  
 Organisational  
 Resources



**Martin Tjipita**  
 General manager,  
 Operations



# 2016 at a glance

Produced 1,850 tonnes of uranium oxide compared with 1,245 tonnes in 2015

Refer to page 16 and page 19 for further detail

Turnover increased from N\$1.8 billion to N\$3.1 billion

Refer to page 67 for further detail



Spent N\$2.4 billion for products and services of which N\$1.8 billion was spent in Namibia

Refer to page 59, page 60 and page 61 for further detail

Invested N\$15.4 million in neighbouring communities

Refer to page 37 for further detail

Since 1980, recycled 60-70 per cent of water used

Refer to page 50 for further detail



Invested N\$7.6 million in training and development, benefiting 130 participants

Refer to page 24 and page 25 for further detail

Proudly maintained certification for ISO 14001:2004

Refer to page 26 for further detail

Eleven bursary students received sponsorship at a total investment of N\$1.1 million (excluding vacation work)

Refer to page 24 and page 25 for further detail



98.4 per cent of employees are Namibians

Refer to page 24 for further detail



Mined 24.4 million tonnes of rock and milled 9.1 tonnes of uranium-bearing ore

Refer to page 16, page 17 and page 19 for further detail



Paid N\$80.4 million and N\$50.8 million to Namibian Government in royalties and dividends respectively, as well as N\$392.7 million to public enterprises, totalling N\$523.9 million

Refer to page 58 and page 61 for further detail

Paid N\$5.6 million towards Vocational Education and Training Levy

Refer to page 25 and page 61 for further detail



Realised a profit from normal operations of N\$107 million compared with N\$385 million net loss in 2015

Refer to page 4 and page 67 for further detail

Recorded an All-injury frequency rate (AIFR) of 0.82

Refer to page 35 for further detail

Received environmental clearance certificate for desalination plant

Refer to page 51 for further detail

Paid N\$613.8 million in salaries benefitting 949 permanent and 31 temporary employees

Refer to page 61 for further detail

17 per cent of employees are female

Refer to page 24 for further detail



# Our sustainable development approach

Focusing on the issues that matter most

## Economy

### Economic viability

In order to provide the best returns on our shareholders' investment, we need to understand the long-term demand for our product as well as the cost, resource availability and value creation associated with that demand. Economic viability also ensures that we continue to make significant contributions to Namibia's economy and her people in various ways.

## Social

### People

Our workforce is central to our business. This means ensuring a safe and healthy workplace geared for human resource development in order to attract and retain employees, while maximising our contribution to their well-being.

### Communities

By understanding the diversity of neighbouring communities, and through continuous interaction with them, we can respond to their concerns and needs. Moreover, communities should realise a net benefit and a long-lasting, positive effect from our activities.

## Environment and product stewardship

### Environmental and asset resource stewardship

We aim to be the leader in environmental stewardship in Namibia and to maintain our reputation as a responsible corporate citizen. This can be achieved by understanding and appreciating our natural resources, both biotic and abiotic, utilising them sustainably, and creating a net positive impact.

### Product stewardship

This theme focuses on expanding our understanding of the impact of our product on society by working with all interested and affected parties.

## Governance

### Corporate governance and compliance

We strive to be transparent and proactive in all our business operations. To this end we have auditable business systems in place which form the backbone of good corporate governance.

## Sustainable development is the distinctive, significant and characteristic centre of our overall approach to business.

Driving the integration of sustainable development at Rössing Uranium are the six themes highlighted above. These themes form the framework in which our business is conducted.

Everything we do is in line with the generally accepted definition of *sustainable development*, namely development that meets the needs of the present without compromising the ability of future generations to meet their needs.

This suggests that meeting the needs of future generations depends on how well we balance social, economic and environmental needs when making decisions today.

The aim of sustainable development is therefore to seek out win-win situations that can achieve environmental quality and increase economic wealth and social well-being, today and tomorrow.

Our vision remains focused on:

- creating long-lasting positive effects for the people of the Erongo Region and Namibia;
- building capacity to ensure that we contribute to the future well-being of our employees;
- minimising negative impacts and optimising positive ones; and
- maintaining our reputation as a responsible corporate citizen of Namibia.

When conducting our business we ensure that we maintain a balance in the way we:

- use our assets — both our own resources and environmental resources — to reflect our integrated approach in terms of profit, people and planet;
- contribute positively to the needs of society by providing support to stakeholder communities without creating dependency; and
- generate economic wealth.



# Our key drivers

## Our strategic map

**Mission:** To be a uranium supplier to the global nuclear industry creating maximum return for our shareholders – whilst delivering benefits to all stakeholders.

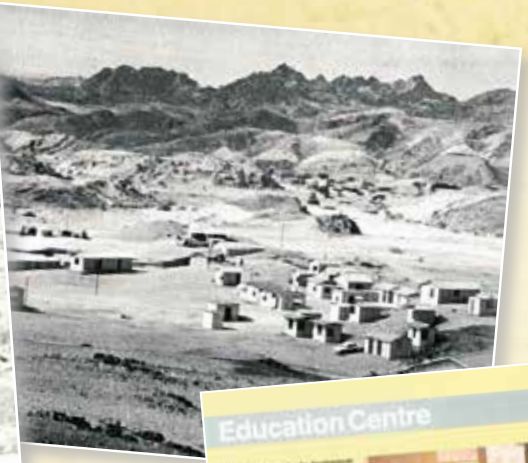
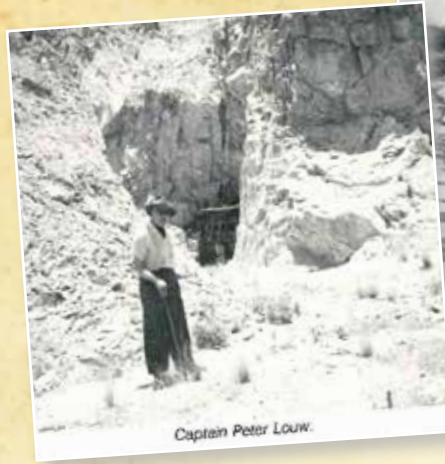
**Vision:** To be the safest and most efficient, long-life uranium producer in the world.

Strategic focus areas	Objectives
Health, safety, environment and community	Zero harm
People and culture	Talent management
	Living the values
Operational efficiency	Achieve Integrated productivity model targets
Financial	Ensure cash flow
	Reduce unit costs
Partnerships	Transformational compliance

**Core values:** Safety \*\* Teamwork \*\* Respect \*\* Integrity \*\* Excellence



*A view of the Open pit and surrounding landscape. The Open pit currently measures 3 km by 1.5 km, and is 390 m deep.*



# 40 years of production

## A lasting legacy for Namibia

In 2016, we celebrated 40 years of production — indeed a proud milestone for Rössing Uranium. True to our slogan ‘Working for Namibia’, we have made an enormous contribution to the socioeconomic development of Namibia during this period. We are proud that we could make a difference in the lives of our employees, the neighbouring communities and Namibians across the country. Here are just some of the ways we are making a difference.

### The early years

- 1928 - 1965:** The pioneering stage, when the original prospectors found signs of mineralisation.
- 1966 - 1971:** The exploration stage, when basic prospecting was done and the feasibility of establishing a mine was recognised.
- 1972 - 1976:** The development stage, when the construction of the mine took place.

**July 1974:** Construction of the mine started with the pouring of concrete for the large mine workshops. During the next two years, construction teams poured 30,000 cubic metres of concrete, erected 2,200 tonnes of steel plate and installed 15,000 tonnes of mechanical equipment in an isolated spot in the Namib Desert, bringing Rössing Uranium mine into existence.

**1974-1976:** The initial pit development was done; the pilot plant constructed; temporary and permanent water supplies laid on and the power line destined for Walvis Bay diverted and strengthened to link up with the mine. Arandis took root and in Swakopmund, houses were grafted onto the Vineta and Tamariskia suburbs.

**March 1976:** The mine and plant began operating, but setbacks arose from the abrasive nature of the granite rock containing the uranium minerals. A series of major alterations and additions to the plant, costing N\$100 million at the time, was put in hand.

**February 1980:** The product recovery section had the highest production of uranium ever for a period of 24 hours to exceed the previous world record at the time.

**1981:** The Rössing Primary School and the Kolin Foundation Junior Secondary School opened in Arandis. Both schools were built by the Rössing Foundation in cooperation with the

Damaraland Government, with funds provided by the Kolin Foundation while the project was managed by Rössing Uranium.

**1982:** Professor Chris Barnard, world-famous heart transplant surgeon, visited the mine as a guest of the Rössing Foundation.

**1984:** Built by the mine, the Rössing Cottage Hospital in Swakopmund was officially opened.

**October 1987:** The first-ever 10 per cent trolley-assist ramp in the world came into operation at Rössing Uranium.

**April 1989:** The British Prime Minister, Margaret Thatcher, visited the mine.

**June 1989:** Rössing Foundation celebrated a decade of service to Namibia; during this time approximately 10,000 Namibians completed various training and development courses at the Foundation.

**August 1989:** Martti Ahtisaari, Special Representative for the Secretary-General of the United Nations, visited the mine.

**1990:** Commissioning of the first stage of upgrade of the Control processing centre, which included the installation of a new operating station with the latest touch-screen technology.

**1990:** Rössing Uranium's first social and economic report was published in 1990.

**July 1990:** Rössing Uranium welcomed Namibia's first President, Dr Sam Nujoma, and President of Botswana, Dr Quett Masire, at the mine.

**1992:** Her Royal Highness Queen Elizabeth and Prince Philip, Duke of Edinburgh, visited the Rössing Foundation's Windhoek-based operations. They were accompanied by the Namibian Prime Minister Hage G Geingob.





**April 1992:** Rössing Uranium handed over control of Arandis and its infrastructure, valued at R100 million to the Peri-urban Development Board of the Ministry of Local Government and Housing.

**1992 and 1996:** Frank Fredericks, who worked at Rössing Uranium, won four silver medals at the Olympic Games (two in 1992 and two in 1996), making him Namibia's only Olympic medalist.

**1996:** Employees celebrated the 20<sup>th</sup> anniversary of the mine's operations.

**1999:** The first of five 182 tonne-haultruck pans for Rössing Uranium's new Komatsu Haulpak 730E trucks arrived on site. The pan was transported by road from Sishen in South Africa over a distance of 1,700 km.

**2003:** Almost 27 years to the day since the first uranium oxide was produced on 25 June 1976, the mine produced its 100,000<sup>th</sup> tonne of uranium oxide, a significant milestone in the history of the mine.

**2004:** Faced with another decade of depressed mining conditions, Rio Tinto took a hard decision: the Rössing Uranium mine would close down by 2009.

**2004:** The Omba Arts Trust was established by the Rössing Foundation. (Thereafter the trust developed as an independent, non-profit organisation.)

**2005:** An upsurge in the uranium price rekindled interest in uranium exploration worldwide; the mine started paving the way for increased production and growing the business.

**2006:** Rössing Uranium once again made history when the first ever female driller, Christina Titus, joined the drilling team.

**Late 2005s:** Starting in late 2005, much like in the 1970s, nuclear energy started to become a more attractive alternative source of energy, leading to a new lease of life for the mine. While uranium prices remained depressed for most of the 1990s at levels below US\$10 per pound, by beginning 2006 the price went up to US\$54 per pound and continued to rise to over US\$100 per pound before levelling out at around US\$75 by mid-2008.

**2008:** The mine produced 4,108 tonnes of uranium oxide in 2008, the most in 20 years. The last time that 4,000 tonnes of uranium oxide was produced was in 1998.

**2008:** Achieving nearly three million lost-time injury-free hours in October 2008 was a major milestone.

**2008:** The three Rössing Foundation education centres in Arandis, Ondangwa and Swakopmund were completed, ushering in a new era for the Foundation's education support programmes.

**2009:** Namibian President Hifikepunye Pohamba visited the mine for the first time.

**March 2011:** The effects of the nuclear incident at the Fukushima Daiichi nuclear powerstation in Japan led to a decline of uranium prices.

**2012:** Rössing Uranium's Z20 ore body, neighbouring Swakop Uranium's Husab ore body, turned out to be a significant resource.

**2015:** Rössing Foundation expanded its education support programme with the launching of the first mobile education laboratory, taking the support programmes to schools in outlying areas of the country.

**2016:** Rössing Uranium celebrated 40 years of production.



# Marketing our product

**All uranium produced by Rio Tinto's mines is marketed by Singapore-based Rio Tinto Uranium under buy-and-sell agreements with the mines. These arrangements allow Rössing Uranium to compete for better sales opportunities which require a multi-source supply.**



**Clark Beyer**  
Managing director, Rio  
Tinto Uranium

“

While Rössing Uranium had a very successful year from the standpoint of production in 2016, the uranium market finally appeared to have hit rock bottom, five years after the Fukushima incident in Japan. The main reason for the low market is the fact that production and supply are still rising, overwhelming the more muted demand side of the market, as two of the largest mines in history are being added to global mine production. Until the supply side is rationalised to be more in line with actual demand, it is hard to see a significant price recovery.

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As one of the longest-operating uranium mines in the world, Rössing Uranium supplies its material via Rio Tinto Uranium to electricity companies located in all three major markets, namely Asia, North America and Europe/Middle East.

In addition, we have supplied uranium directly to South Africa's Eskom for the production of power for southern Africa. Almost all of Rössing Uranium's production is marketed through long-term contracts with a diverse number of customers worldwide.

Somewhat unexpectedly, the uranium market suffered a severe collapse in 2016, following a relative stable market in 2015, with a spot price holding around US\$35 per pound for the entire year. At that time, many analysts believed that US\$35 would prove to be the market low point, given that a few Japanese reactors were finally authorised to re-start.

Unfortunately, this was not to be the case, as the emergence of additional secondary supplies and large volumes of new production in 2016, as well as the very slow rate of progress in Japan, combined to cause the market to fall 50 per cent between January and November, before stabilising at year-end around US\$20 per pound.

During this same period, the long-term price indicator also fell, but somewhat less drastically, from US\$44 at the beginning of the year to US\$32 by year end. Rössing Uranium's sales are more tightly linked to the long-term indicator than to the spot price, and are therefore protected by higher base prices and price floors. However, the collapse in both market indices resulted in a small negative effect on revenues for the year.

The cause of such a large drop in spot prices is difficult to pinpoint on any one factor. There are certainly a number of causes. The situation in Japan remains troubled with only three nuclear reactor units operating for most of the year with long delays in regulatory approvals for additional reactor re-starts.





*The uranium-bearing ore at Rössing Uranium is mined through drilling, blasting, loading and hauling from the Open pit. The ore is delivered to the Primary crushers and then passes through a further series of crushers – secondary and quaternary crushers in the photograph – before extraction of the uranium can be done to produce our product, uranium oxide.*



It is difficult to predict how many units will ultimately be allowed to re-start in Japan, or how long it will take to bring all of those units back online. Regardless, the industry in Japan, formerly the largest and most profitable market in Rössing Uranium's long history, is likely to be only a fraction of its pre-Fukushima size of 54 operating units in the end.

Demand from other quarters has also been lower than was hoped. Several US utilities have announced premature reactor closures due to extremely low electricity prices caused by abundant shale gas and heavily-subsidised renewable energy sources.

Laws passed in the states of New York and Illinois in 2016 will likely save some existing units by way of subsidies for carbon-free electricity, but other units in deregulated power markets remain at risk of premature closure.

Even in China, with the fastest nuclear power growth rate, new-build projects are slowing down. It appears the industry will not meet the 2020 government target of 58 Gigawatt electric (GWe) installed nuclear capacity. It will be closer to 53 GWe. China has also taken advantage of falling prices to build up a large volume of natural uranium inventories.

That country's utilities may not continue to support the market with the volume of purchases they have sustained over the past five years. By far, China remains the leader in the expansion of nuclear capacity, but it is now clear that it will not grow at the rate that was expected before the Fukushima incident occurred.

Meanwhile, with a disadvantage to market prices, the supply of uranium is growing rapidly. Much of this growth can be attributed to the entry of two, large mines in the supply equation, namely Cameco's Cigar Lake, which reached a full annual capacity of 18 million pounds uranium oxide in 2016, and Swakop Uranium's Husab project, close to Rössing Uranium in Namibia's Erongo Region.

The latter project experienced a few start-up delays, but has now begun commercial operation, and its Chinese owner, the China General Nuclear Power Corporation, remains committed to a full production rate of 15 million pounds per year over the next few years.

This new supply, on top of the roughly 60 million pounds per year coming from Kazakhstan and all other world suppliers, is more than sufficient to meet any

demand from the marketplace for the next few years. In retrospect, it is easy to see why market prices were destined to fall.

Higher-than-expected levels of secondary supplies also contribute to the surplus supply problem. The problem is exacerbated by excess uranium stocks produced by enrichment facilities. Nuclear fuel enrichment facilities are able to utilise their excess capacity to upgrade enrichment tails (waste) material and turn it into natural uranium, which in turn competes on the market with primary mine supply.

Given the efficiency of the centrifuge enrichment process and the large capacity of Russian and European enrichment facilities, this source of supply is unlikely to diminish anytime soon.

Bearing in mind the demand-side problems and excessive production of the past few years, inventories are high at all levels of the supply chain. This has kept a number of buyers off the market as they seek to consume these inventories. On the brighter side, American and some European utilities will remain mostly uncovered into the early 2020s, and therefore should be present in the marketplace in 2017 to satisfy some of that demand with long-term contracts.

Others may believe that prices are now truly at a low point, already below the cost of production at most mines around the world. Consequently, it is a good time to lock in new contracts. It is likely that 2017 will be a better year for mid- and long-term contracting than was the case in the period between 2014 and 2016.

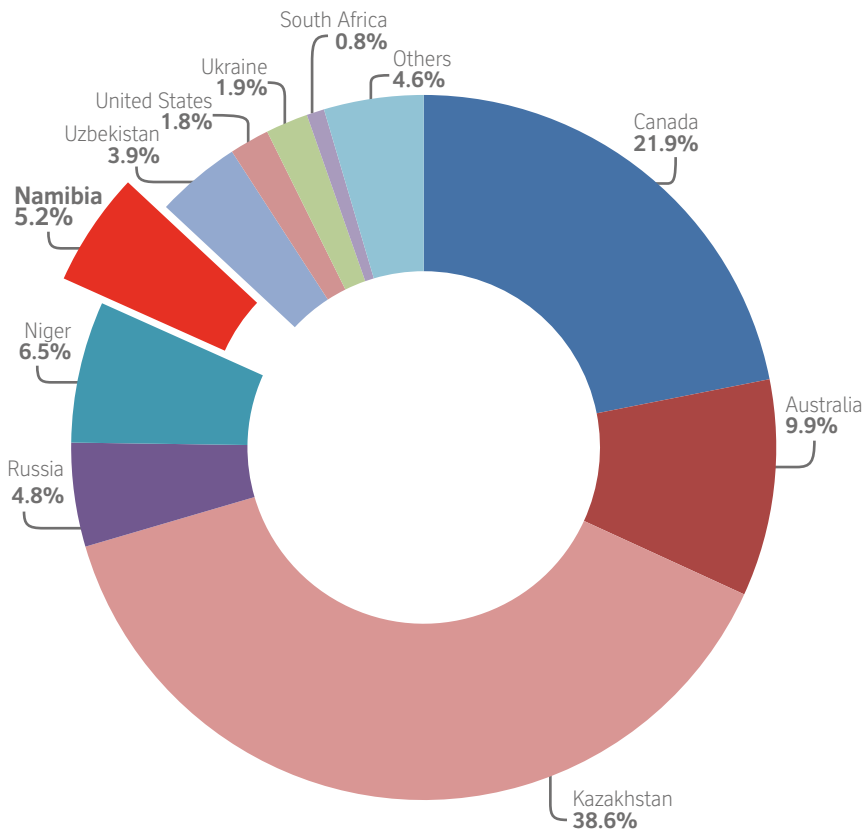
In short, it is still a very challenging time for the uranium production industry as a whole and not just for Rössing Uranium. All producers will need to keep costs low in an overly-saturated market.

The current imbalance between supply and demand is expected to correct itself by 2020 or so, but a significant near-term recovery is unlikely, unless a major supply disruption occurs.

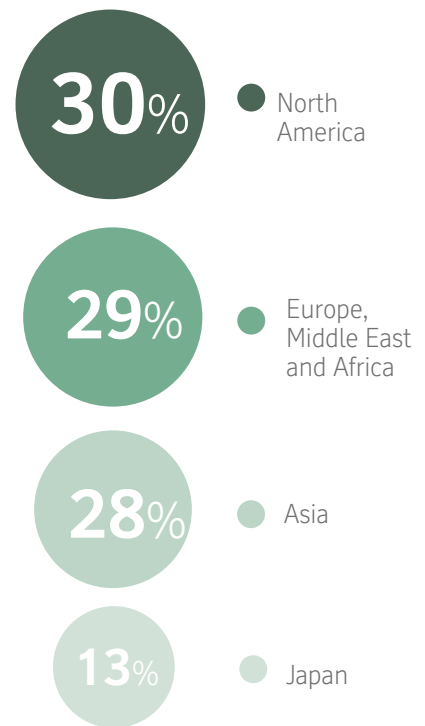
Demand is unlikely to come to the rescue in the short term, but utilities still value the diversification attributes that Rio Tinto and Rössing Uranium bring to their fuel portfolios. More importantly, nuclear power still has a critical role to play in the world's energy security, reliability and carbon mitigation goals.



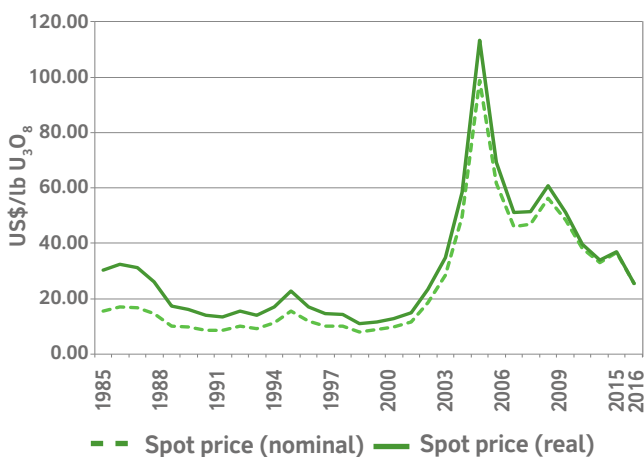
**Figure 1: World primary production of uranium oxide (%), 2016**



**Figure 2: Rio Tinto Uranium customers by region (%), 2016**



**Figure 3: Uranium spot prices (US\$/lb U<sub>3</sub>O<sub>8</sub>; annual averages), 1985 to 2016**



Source: UX Consulting/US CPI

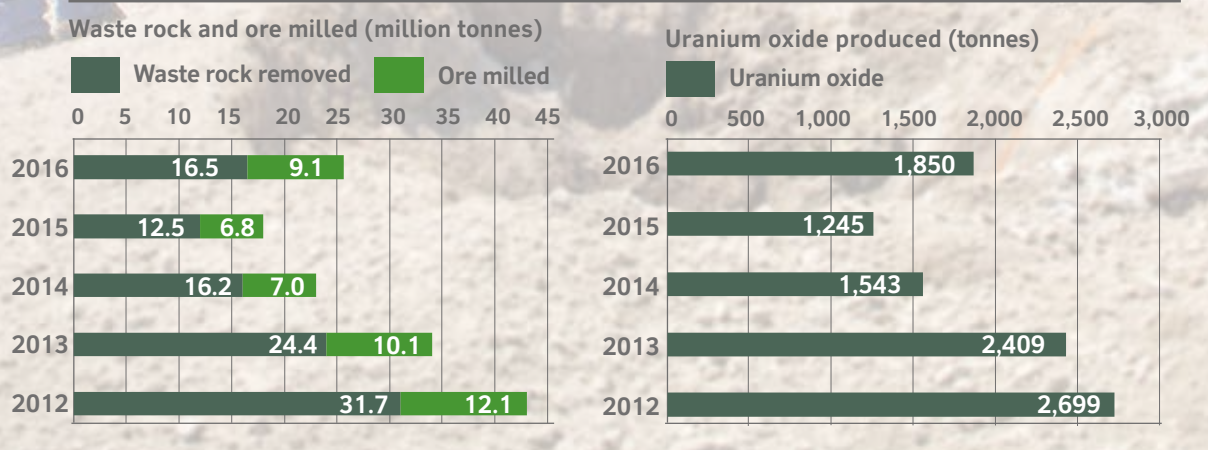
**Figure 4: Uranium prices (US\$/lb U<sub>3</sub>O<sub>8</sub>), 2005 to 2016**



Source: UX Consulting/US CPI



**Figure 5: Production, 2012-2016**





# Our operations

**Rössing Uranium's operations are built on two distinct activities: mining uranium-bearing rock, and processing this ore into uranium oxide for the world's nuclear energy market which fuels the generation of electricity. Our attention is directed towards creating shareholder value and maintaining a secure and viable business, as well as ensuring we remain a long-term contributor to Namibia's economy.**

The uranium located in our mining licence area is embedded in very hard and abrasive granitic rock, known as 'alaskite'. To move the necessary volume of ore and waste, we must conduct blasting operations at least once a week.

Electric and diesel-powered shovels load uranium-bearing ore onto haul trucks, which transport the ore to the primary crushers for the first stage in the crushing process.

From there, the crushed ore is conveyed to the Coarse ore stockpile, where it is reclaimed and put through additional crushing stages in the Fine crushing plant, before the processing stage of operations begins.

## Mining operations

Having returned to a four-panel shift roster and a seven-day operations schedule at the end of 2015, 2016 witnessed an increase in production of rock mined.

We mined a total of 24.4 million tonnes of rock, of which 8.0 million tonnes were uranium-bearing ore from the Open pit and 16.5 million tonnes were waste rock. In addition, 1.2 million tonnes of uranium-bearing ore was fed from the stockpiles to achieve a waste-to-ore strip ratio of 1.97 and a ratio of 0.56 in respect of ore milled to waste rock removed.

The north-west area of the Open pit, referred to as Phase 2 of the SJ Pit, was the main source of uranium-bearing ore in 2016.

A key focus in 2016 was on the segregation of light vehicles and heavy mobile equipment traffic, which progressed well in some areas. These efforts will continue in 2017.

The highlight of the year was an initiative on the part of a number of Rössing Uranium's personnel to identify productivity and efficiency improvements in both the operational and maintenance areas. The impact on equipment availability has been significant. We now need to focus on operational productivity in the areas of shift change, cycle times and payloads.



*(Left) Members of the drill and blast team at the mining operations checking on newly drilled blast holes to be charged in preparation for a production blast.*

*(Above) Processing plant operations are closely managed from the Central processing control (CPC) room.*

### Drape wire meshing project

During 2016, the geotechnical team completed a drape wire meshing project aimed at reducing the risk of rock falls around the Trolley 14 area of the Open pit. The project began towards the end of 2015.

In the preceding reporting year, rock fall had earlier damaged the installed trolley system, leading to increased production costs due to downtime for repairs. This ramp is one of the major arteries of the pit and will be accessed for the life of mine up to 2025.

The slope above Trolley 14 was designed to be 15-m high benches with a 10-m catchment bench. However, in some cases the crest was damaged due to subsequent blasting activities. The result was a rock mass with loose blocks hanging along the crest of the bench face. This was the source of rock fall.

Although temporary measures were put in place to mitigate the identified risk, it was imperative that a long-term solution be found in order to minimise the danger posed by these rock-fall hazards to the operations below this area. The solution was found in drape meshing.

A total of 16,500 m<sup>2</sup> of mesh was laid, requiring 13 rope-access technicians working on the slope with four assistants and a site manager from the contractor company. The project was overseen by Rössing Uranium's geotechnical team.

The meshing was done by 'rolling' the wired drape mesh down the slope with the assistance of a crane and winches as well as rope-access personnel tying the mesh together. Each panel was attached to the adjacent panel with wire fasteners forming one, large blanket on the slope.

The benefits of the drape wiring meshing project are far reaching, as the meshing area is now safe from any rockfalls unto the Trolley 14 area.

### Looking ahead

Objectives for 2017 are to improve availability of mining equipment, maintain a highly effective utilisation of equipment and improve scheduling, together with an upgrade of the mining dispatch system.

*(Inset photograph)  
The yellow dotted lines indicate the Trolley 14 area of the Open pit where the drape wire meshing was installed to eliminate rock fall.*





## Processing operations

The Processing plant is responsible for the extraction of uranium from mined ore through a number of stages to produce uranium oxide. This product is securely packed and shipped to our customers for further conversion. The aim of the plant is to produce targeted quantities of uranium oxide in the most efficient and safe manner possible.

In the previous reporting year we experienced major challenges at the counter current decantation thickeners and at one point had only 50 per cent availability of thickeners, which exposed us. With a focused approach from our Maintenance and Engineering departments, we increased our overall thickener availability from 50 per cent in 2015 to a targeted 80 per cent in 2016. This greatly improved the washing efficiency and overall recovery of uranium.

Considerable success was also achieved in removing bottlenecks and improving milling efficiencies. The goal was to reach 38,000 tonnes crushed per day consistently. After analysing the downtime trend and removing bottlenecks, the frequency with which we achieved more than 2,000 tonnes per hour crushed improved from an average of 11 per cent achieved during the six months prior to the project to 15 per cent during the three months of the project. It is expected that when this improvement continues to increase, it will contribute significantly to the achievement of 38,000 tonnes crushed per day. A post-implementation review is scheduled for October 2017 to assess the effectiveness of these improvements in addressing the bottlenecks to consistent throughput.

These efforts, combined with having returned to a 24-7 production, resulted in increased mill throughput and a 48 per cent rise in production from 1,245 tonnes of uranium oxide produced in 2015 to 1,850 tonnes in 2016.

In addition, the mine completed a high calc (calcium carbonate) engineering study and is ready to implement changes to the counter current decantation thickeners in 2017. In the near future we expect to mine higher grade ore with a high calc index. It will therefore be important for the plant to have the capacity to process it. The implementation of these changes will enable us to process high calc ore, with a higher uranium grade, more efficiently.

## Looking ahead

In 2017 we will continue with the refurbishment of the major process tanks, as well as with the seepage upgrade project. The seepage upgrade project will be implemented to improve the monitoring of seepage systems and improve in seepage recovery.

In addition, a water saving project will be implemented to minimise freshwater usage in the mine as well as maximise the use of recycled water.

*A GD drill in the Open pit preparing a blast area.*





*(Above) Safety signage ensures that workers adhere to the specified PPE (Personal Protection Equipment) requirements for each area.*

## Engineering and projects

During 2016 the Projects section was responsible for designing and implementing various capital and operational improvement projects. Among others, three major projects were undertaken.

### Relocating section of Trolley 13 infrastructure

Since the mid 1980s when the first 1,200 volt DC trolley-assist system was installed on the ten per cent-gradient haul roads, the mine has operated its 730E Haulpak fleet successfully.

The immediate benefits of trolley assist are that fully laden trucks accelerate from 11.5 km/h to roughly 17 km/h, shortening the cycle times and increasing the refuelling intervals. Also, engine life is benefitting from trolley assist as, in effect, electricity is used as a source of energy to propel the truck up the 10 per cent gradient haul road, instead of diesel. Lastly, by using electricity, the trade-off between electricity and diesel usage ensures a huge cost saving.

An assessment in early 2016 indicated that the mine would benefit from fast-tracking the relocation of a section of Trolley 13 line, as the tonnage exiting the Open pit via Haulroad 17 compared with Trolley 13 will be ten times more. The relocation was completed

during the reporting year and in December 2016, the fully-tested, commissioned and operational Trolley 17 line was handed over to mining operations.

### Upgrading of lost opportunity and reporting system

Initially developed to be used by the production team to gain visibility on downtimes and reduced feed in the respective plants, the engineering team also started using the lost opportunity and reporting system to identify engineering opportunities and problem areas.

During 2016, the system was upgraded to link in with other Rio Tinto business units for greater efficiency. The system was implemented and went live in May 2016; since then it has been expanded to suit Rössing Uranium's requirements. Custom reports can now be compiled to enable decision making to identify bottlenecks in the production process. The system can drive costs reduction through structured problem solving and continuous improvement, while causes of unplanned downtime can be identified and unplanned production losses reduced.

### Reagent plant upgrade

The upgrade of the Reagent plant was successfully completed. (See case study on next page.)



# New Reagent plant added to the mix

**Rössing Uranium has been at the forefront of innovations in technology for many years. The mine's new Reagent plant is the latest example. Now ready for operation, it comes with various improvements.**

Replacing the old manganese dioxide ( $MnO_2$ ) plant, the new facility includes a brand new, bag loading and off-loading bay, allowing two trucks to off-load daily, as well as a vastly improved make-up component.

A number of distinct advantages to the improvements include environmental, health and safety advantages, coupled with a more cost-effective, reliable and quality-driven process.

The use of a mobile crane with swinging arm is no longer required since the loading bay now has its own, automated overhead crane. This means loading and off-loading can be done safely by way of wireless remote control, while eliminating the need for a mobile crane, thus reducing expenses.



The new, automated Reagent plant will eventually be operational on a 24-hour basis, meeting process requirements for oxidant solutions and supporting long-term plant-throughput targets.

## Information systems and technology

### Radio network in the Open pit

The radio network system was upgraded in 2013 from an analogue to a digital system. The current network covers a number of areas at the mine.

The network experienced 'dead spots' which resulted in a safety risk and also impacted production.

During 2016, radio network experts from a local service provider undertook a system review and optimisation exercise. Based on the assessment, adjustments have been made to the antennas and radios. Since then, the system has been stable and fully functional.

The radio network will be extended in 2017 to areas that are not covered yet.

### Honeywell fail-over servers moved to IT server room

The Processing plant control system, the Honeywell Experion Plant Knowledge System, is the core of the plant's operation. A failure of this system will result in an inability to operate without mitigation.

During the previous reporting year, the mine invested in significant upgrades and improvements to this system which employs newer technologies such as virtualisation and fault-tolerant ethernet to improve resiliency.

In 2016, the plant control network has been redesigned, including moving two of the five virtual server hosts from the Central processing control server room to the IT server rooms in a separate building, making the operation resilient to failure of either server room.



# Our people: the backbone of our business

**Our workforce remains the backbone of our business, as they drive productivity to achieve goals and objectives. They continue to be a key focus in our sustainable development approach, which assures a safe and healthy workplace, geared for human resource development. This approach enables us to attract and retain employees.**

Aspiring to be an employer of choice, Rössing Uranium provides long-term and rewarding employment.

We believe that through employment creation, we are making significant contributions to society and the economy. We strive to keep our workforce committed by implementing initiatives that benefit both the company and our employees.

In addition, we promote a culture in which our employees are highly motivated and feel valued for their contribution. Throughout the company, we strive to build a sense of purpose and achievement in the work we accomplish.

The Human resources section supports this strategy by delivering outcomes for key objectives ensuring that processes are streamlined in focal business areas.

## **Workforce at a glance**

Rössing Uranium had a total workforce of 949 employees at the end of 2016.

The average number of contractors at the mine during the reporting period was 752.

## **Employee relations**

Rössing Uranium has an exclusive bargaining agreement with the Mineworkers Union of Namibia. A total of 75 per cent employees are covered by the collective bargaining agreements and no incidents of discrimination, no infringements of the right of association and no instances of child or forced labour were reported during the reporting period.

Focused interest in the welfare of our employees has been critical in creating a high-performance culture throughout the company and has engaged the commitment of all stakeholders to create a working environment that is conducive to the optimal performance of each employee. As a result, all leaders, including our social partners, the Mineworkers Union of Namibia, underwent the Rio Tinto leadership values workshop with the aim of solidifying an engaged workforce in which everyone feels connected, safe and at home.

Our workforce of diverse cultural backgrounds and work experience is an important factor in achieving success in our business objectives. The aim is to continuously improve engagement with our employees. Inclusion and diversity remains a key focus at the mine.

During the period under review, a collective grievance was presented to the management team in the form of a petition regarding job security which was prompted by the consolidation of contractors on site, among other factors.

The Governor of Erongo Region, Mr Cleophas Mutjavikua, also initiated a tripartite discussion with the Namibia Chamber of Commerce and Industry, the Mineworkers Union of Namibia and Rössing Uranium's management to address similar concerns that were referred to his office by the aggrieved business community.

As social partners, the Mineworkers Union of Namibia and the mine's management team appointed a taskforce to investigate the concerns raised in the petition. All the concerns addressed were subsequently resolved internally.

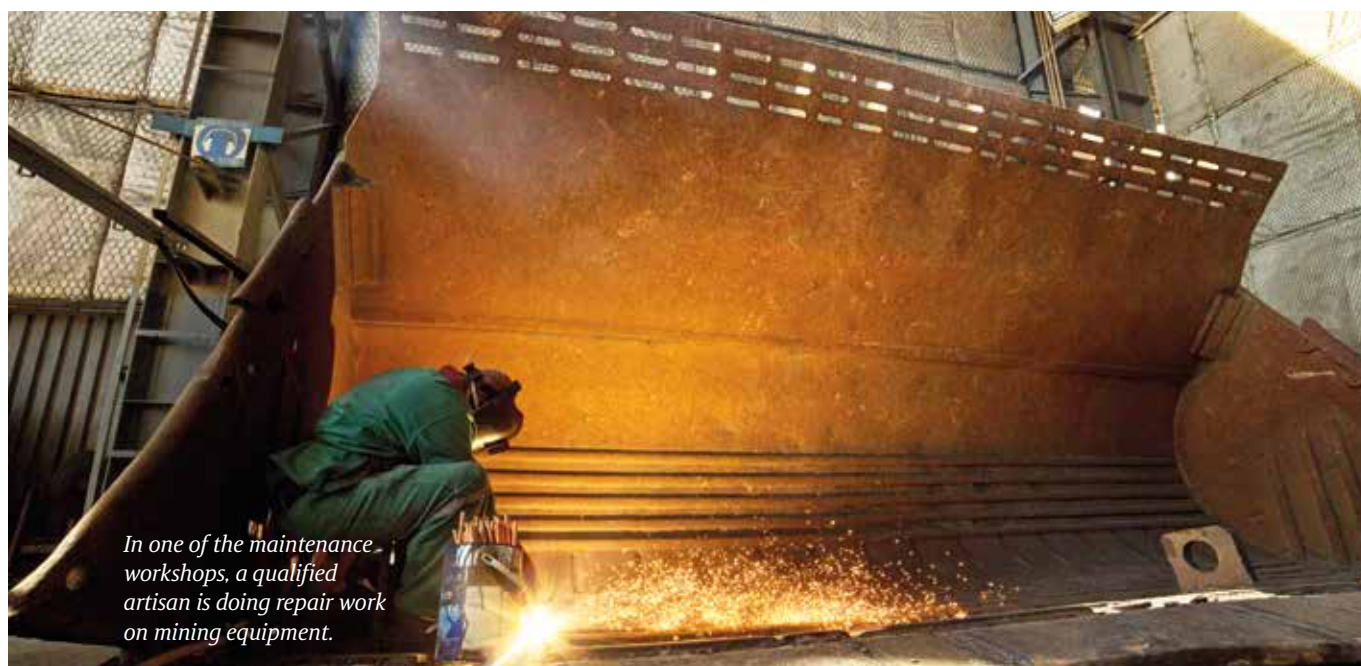




Figure 6: Number of employees



*A Cybermine simulator is used to train Pit Viper drillers in the safe and efficient working of the drill. Skills trainer, Petra Anton, demonstrates the use of the simulator.*



*In one of the maintenance workshops, a qualified artisan is doing repair work on mining equipment.*

Workforce profile	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)
Historically disadvantaged Namibian men	80.0	79.1	76.0	77.1	78.2
Historically disadvantaged Namibian women	13.1	13.7	16.0	15.7	15.5
Previously advantaged Namibian women	0.9	1.1	1.6	1.7	1.5
Previously advantaged Namibian men	4.3	4.5	4.7	3.7	3.0
Non-Namibian men	1.4	1.6	1.6	1.5	1.5
Non-Namibian women	0.1	0.0	0.0	0.1	0.1
Persons with disabilities: men	0.1	0.2	0.2	0.2	0.2
Persons with disabilities: women	0.0	0.0	0.0	0.0	0.0

#### Statistical information on our workforce, 2016

Local and foreign employees:

- Namibians: 98.4 per cent (934)
- Non-Namibians: 1.6 per cent (15), including:
  - 0.5 per cent (5) work permit holders, and
  - 1.1 per cent (10) permanent residence permit holders
- Female representation: 17.0 per cent (161)
- Average age of new employees: 34 years
- Average age of all employees: 39.7 years
- Number of employees who left the mine's employment: 91
- Number of new employees recruited: 92

#### People supported by Rössing Uranium — 2012 to 2016: Number of participants in training and development programmes

Nature of participation	December 2012	December 2013	December 2014	December 2015	December 2016
Trade bursaries	55	54	20	10	0
Trade job attachments	0	0	0	10	10
Apprentice employees	2	2	2	1	0
College/university bursaries	29	23	16	10	11
College/university job attachments outside company bursary scheme	1	0	3	0	3
Employees enrolled at a technical college (full-time studies)	0	0	1	1	1
Employees enrolled at a college/university (full-time studies)	5	2	3	3	2
Employees involved in correspondence programmes	39	5	4	12	8
Employees enrolled in the Leadership development programme (in-house)	27	0	0	0	64
Rössing Uranium dependant scholarships awarded	85	35	31	25	26
Employees in limited-contact studies in various fields	3	2	5	3	5
<b>Total number of participants</b>	<b>246</b>	<b>123</b>	<b>85</b>	<b>75</b>	<b>130</b>
<b>Training programme costs — this figure includes all other training initiatives carried out as part of capability development</b>	<b>N\$8.1 million</b>	<b>N\$5.6 million</b>	<b>N\$6.1 million</b>	<b>N\$5.4 million</b>	<b>N\$7.6 million</b>



In the spirit of engagement with employees, consultations in the sale of properties involved Mineworkers Union of Namibia representatives.

From a corporate, social-responsibility point of view, a decision was made to sell the houses in Swakopmund that were owned by Rössing Uranium. The houses were offered to the occupant employees at reduced prices.

Profits from the sale of houses in the Swakopmund suburb of Tamariskia, built under a Notarial Deed of Lease Agreement between Swakopmund municipality and the mine, are to be shared at a ratio of 60:40 between the mine and the municipality.

As a responsible corporate citizen, Rössing Uranium will continue to offer its resources to meet challenges our country may face in creating a sustainable future for the country and its people. By way of its communication and engagement strategy, Rössing Uranium has maintained harmonious relations with its workforce.

## **Inclusion and diversity**

An inclusive culture of diversity is upheld by people, performance and sustainability as cornerstones in the foundation of business that accelerate development and employee retention. This formula is proven by our workforce profile.

## **Capacity and organisational development**

People remain a key priority at Rössing Uranium where business performance is driven to higher levels through capability-development initiatives.

For this reason, we are committed to continual investment in capability development and creating platforms for growth which will drive performance excellence as a basis for employee retention and growth within the company.

Various initiatives were implemented in 2016 to promote the achievement of empowerment and development goals for the workforce in 2017.

### **Management essentials for supervisors programme**

During 2016, Rössing Uranium embarked on a journey in which the Management essentials for supervisors programme was piloted and rolled out for the frontline supervisors. The programme is aimed at strengthening fundamental skills of frontline supervisors, enabling them to develop critical tools to effectively motivate their teams and deliver strong operational performance.

The programme offered a great opportunity for a consistent and effective approach to developing core skills of frontline supervisors across the mine addressing the acquisition of knowledge about the digital environment and the application of skills in the field. The programme is comprised of 12 modules and is presented by leaders from diverse areas of expertise. A total of 64 frontline supervisors have

participated in the programme thus far and the last module is scheduled to be completed by June 2017.

### **Rio Tinto People survey**

Rio Tinto introduced its People survey some years ago to give employees an opportunity to express their views about the company at a Group level. The aim of the survey was to gain insights based on employee perceptions, process that input and improve the business with focused action on a continual basis. Better understanding will help create a safer and inclusive environment where people are empowered and confident to perform, challenge, develop and excel.

Rössing Uranium was a good performer in relation to other business units in the Group, which indicates that the Rössing employees who responded in the 2016 People survey have a predominantly favourable view of working at Rössing Uranium.

### **Educational support**

The development of young Namibians is part of our corporate social responsibility because it contributes to the growth of the country as a whole and ensures that the skills base is broadened and strengthened.

During 2016, 11 bursary students received sponsorship from Rössing Uranium at a total investment of N\$1.1 million (excluding vacation work). Five new bursaries were awarded in the fields of mechanical and civil engineering in 2016 that will take effect in 2017, in line with operational requirements as determined by the manpower plan, which is reviewed annually.

The educational assistance scheme for employee dependants at tertiary level supported 26 dependants at a total investment of N\$481,894.

Ten trade apprentices completed job attachment programmes as part of their tertiary curriculum, exposing them to on-the-job training in their various disciplines. Further opportunities to support trade apprentices will continue during 2017.

### **Vocational Education and Training Levy**

The mine has participated in the Vocational Education and Training Levy submission since its inception. Rössing Uranium has contributed N\$5.6 million for the 2016 cycle.

### **Technical training**

Technical training is pivotal to the mine's operation in terms of building capacity in new and established employees.

A highlight of the reporting year was the refurbishment of the various training centres, the acquisition of a new 3D Cybermine Computerised Simulator System and computer-based training for mining equipment operators. These technical training initiatives will drive knowledge transfer and support the diversification of skills among our employees.

# Ensuring people are healthy and safe



*(Above) Critical risks are identified on a signboard for a specific work area. Critical controls are put in place (eg alarm systems; handling requirements; access control; isolation and lockout, etc) to allow workers to work safely in the various areas.*

**The maintenance of health in the workplace is a basic employment right. For Rössing Uranium, the health, safety and well-being of our employees come first. We understand that our operational environment may be hazardous. For this reason, the identification and management of material risks is a crucial principle in our business approach.**

We consistently strive to create a working environment free of occupational damage, regardless where our people work or what type of work they are engaged in.

We are committed to the concept of zero harm and have put in place rigorous processes to ensure that every employee and contractor finishes his or her working day as safe and as healthy as they were when they reported for work.

The utilisation of a formalised, integrative Health, safety and environmental (HSE) management system is essential in enabling Rössing Uranium to optimise, coordinate and manage our operations, personnel, plant and equipment.

In addition, this management system informs our interactions with the environment and neighbouring communities in a manner that demonstrates the company's consistent application of best practices.

## **The HSE management system**

We manage our operational activities to ensure that all impacts, whether on the biophysical or socioeconomic environment, are reduced to acceptable limits. Our operations are governed by applicable national legislative and regulatory frameworks and controlled by way of an integrated HSE management system.

The structure of the HSE management system generally follows the layout of common international standards such as the International Organization for Standardization (ISO) 14001 (Environment), ISO 9001 (Quality) and the Occupational Health and Safety Advisory Series (OHSAS) of British Standard (BS) 18001.

The HSE management system is designed to assist achievement our goals, which include our legal obligations.

This systematic approach to management performance promotes the most efficient use of resources. The system also offers the company potential financial gain, which supports a win-win situation in terms of HSE and business performance.

An auditing programme periodically evaluates the effectiveness of the HSE management system. All potential impacts are listed on a risk register with related mitigating and operational controls.

We proudly maintained our certification for ISO 14001:2004 in 2016.



## HSEC Policy

# Health, Safety, Environment and Communities

Excellence in Health, Safety, Environment and Communities (HSEC) management is one of the foundations of Rössing Uranium's vision to be the safest and most efficient, long-life uranium producer in the world. This is in line with our commitment to zero harm, corporate citizenship, social responsibility and sustainability.

To accomplish this, Rössing Uranium is committed to:

- The protection of the health and safety of our employees, contractors, stakeholders and host communities.



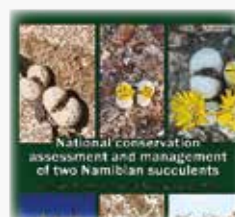
- Identify and assess hazards arising from our activities and manage associated risks to the lowest practical level.



- Operating our business with respect and care for both the local and global environment in order to prevent and mitigate residual pollution.



- Enhance biodiversity protection by assessing and considering ecological values and land-use aspects in investment, operational and closure activities.



- Understand and manage the effects of our product through its entire life cycle.



- Continue in our efforts to raise the awareness of HSEC issues in our neighbouring communities.



- Work with integrity and be in full compliance with applicable legislation and industry best practice.



- Regularly review our performance and publicly report our progress.



- Seek continual and sustained improvement in HSEC performance to create a zero harm work environment.



- Communicate our commitment to this HSEC policy to all interested and affected parties.



**In implementing this policy we will engage in constructive dialogue with our employees, contractors, host communities and all other stakeholders in sharing relevant information and responsibilities for meeting our requirements.**

Werner Duvenhage  
Managing director  
1 January 2017

**RioTinto**  
Rössing Uranium  
Working for Namibia

## Occupational health management

We review and update our risk-based Occupational hygiene monitoring programme annually according to health hazards and levels of risk that are identified to be prevailing or emerging.

The programme currently applies to similar exposure groups (SEGs), which include all Rössing Uranium workers and site contractors. SEGs are groups of workers who have the same general exposure profile because of the similarity and frequency of the tasks they perform, the similar ways in which they perform those tasks and the similar materials and processes they use in their work.

During 2016, our Occupational hygiene monitoring programme included measurement of noise levels, illumination, respirable dust (including crystalline silica and manganese), organic vapours and legionella (a water-borne bacterium that can cause legionnaires' disease).

Dust and noise, identified as critical health risks, are examined in greater detail in subsequent pages.

### Dust

In an open-pit mine such as ours, the removal of topsoil and overburden (the soil and rock on top of the ore body) and the transport of this material, along with the crushing of ore, are typically the major sources of dust emissions.

Dust sources may be:

- localised, eg from blasting, loading trucks, crushing ore, or transfer by conveyor;
- diffused, eg from waste rock dumps or areas of disturbed ground; or
- linear, eg from haul roads.

Mining operations predominantly produce 'fugitive dust', that is, dust derived from a combination of sources, or sources that are not easily identified.

The primary purpose of airborne dust sampling is protection of workers' health by measuring personal exposure to dust to ensure that it is within occupational exposure limits.

Other reasons for dust sampling include evaluating the effectiveness of engineering controls, and to detect variation in dust levels resulting from changes in processes.

The Fine crushing plant is a high-dust-generating area. In 2016 an increase in the amount of dust generated and subsequent dust emissions from the plant were measured compared with those of the previous reporting year.

During 2016, the average dust level was 1.81 mg/m<sup>3</sup> compared with 1.25 mg/m<sup>3</sup> measured in 2015.

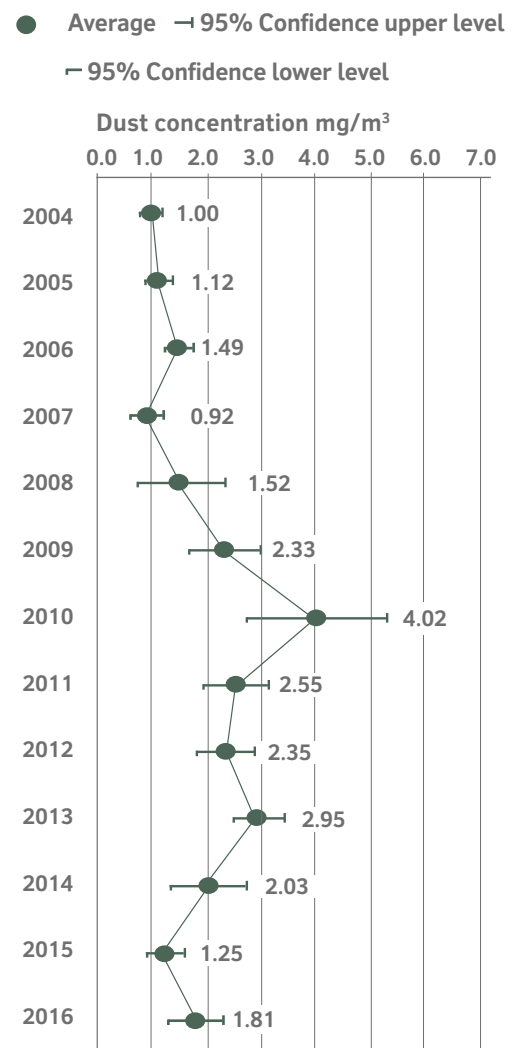
The primary reasons for the increase measured in 2016 include:

- limited water resources;
- inconsistent application work practices due to frequent changes in line leaders for the area; and
- delays in the maintenance and systematic replacement of ducting and dust collector system components.

A review of all dust controls in the Fine crushing plant will be a point of focus in 2017.

Figure 7 depicts fixed position measurements of area respirable dust in the Fine crushing plant. These figures indicate the effectiveness of engineering controls.

**Figure 7: Dust concentration levels at the Fine crushing plant, 2004 to 2016**







Advisor for Occupational Hygiene, Lulia Hamutenya, taking a noise level reading at one of the mine's workshops.

**Noise**

Mining processes are inevitably noisy and noise constantly emanating from large pieces of equipment and machinery, can lead to temporary or permanent hearing loss and speech interference. Human hearing is most sensitive to sounds at or near the centre of the frequency range of speech. To assess the impact of noise on people, a scale of frequency weighting is used.

The 'A weighting' is a frequency filter that has a response similar to the response of the human ear. It therefore provides a good indication of the subjective reaction to sound and of the potential for hearing damage. Exposure to noise should be below the stipulated occupational exposure limit (OEL) of 85 dB (A).

Noise zoning is applied in high-risk areas, together with the application of customised personal hearing-protection devices. In other areas disposable ear plugs are used.

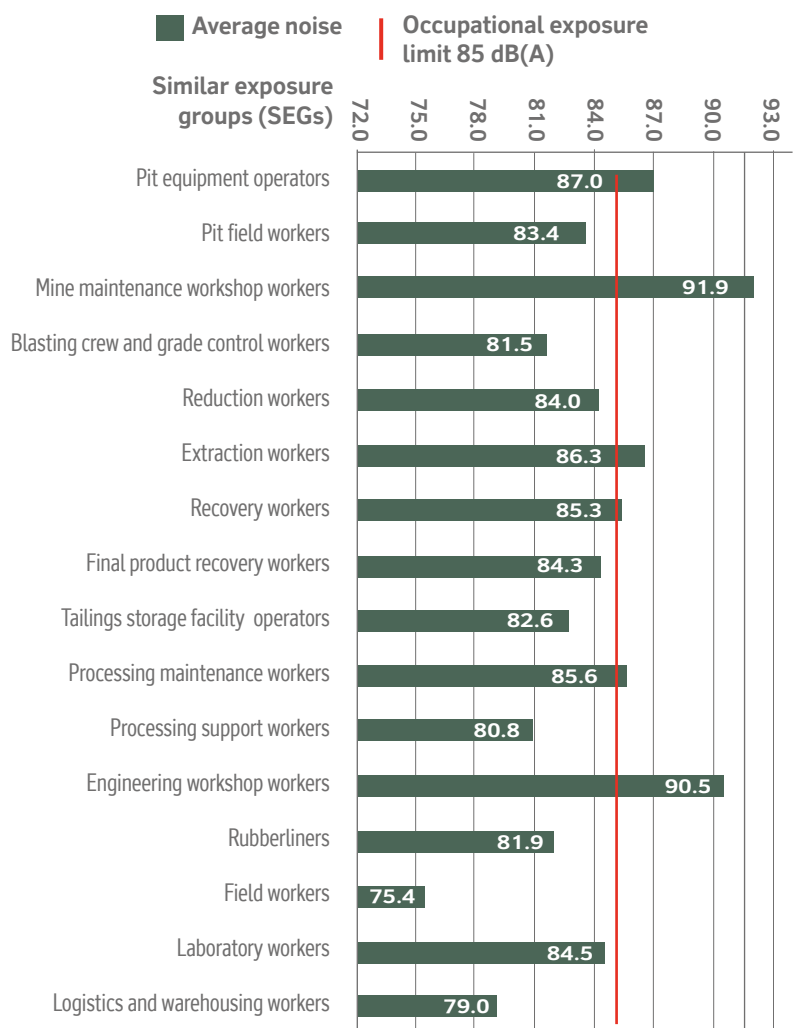
Of the 16 similar exposure groups (SEGs) monitored for personal noise exposure, six exceeded the 85 dB (A) OEL for noise.

Contributing factors to excessive noise include maintenance and operational activities inside workshops, in the Processing plant and on mobile equipment. The main sources of noise that have been identified include the use of impact tools, general plant and equipment noise, as well as high volume settings on radios (two-way and FM stereo radios in the equipment cabs).

Critical control monitoring plans have been put in place and will be maintained. All employees who work in high-risk areas are issued customised hearing protection devices. These devices are maintained and fit-tested on an annual basis.

All employees who work in high-risk areas are issued customised hearing protection devices. These devices are maintained and fit-tested on an annual basis. **Measured exposures indicated in Figure 8 do not take into account the protection factor provided by the custom-made hearing protection devices.**

**Figure 8: Average personal noise exposures, 2016**





(Above) Rössing Uranium makes use of a local medical emergency service (EMED Rescue) for on-site medical support.

The attenuation on these customised personal devices is adjusted when appropriate. Measured exposures do not take into account the protection factor provided by the custom-made hearing protection devices.

The customised hearing protection devices are permanently calibrated to filter out all noise levels above 82 dB (A), and the disposable earplugs provide a noise reduction rating of 26.

Figure 8 depicts average, annual personal noise exposure measured for various, similar exposure groups in 2016.

### Occupational medical surveillance

All employees and contractors undergo pre-employment medical examinations to ensure they are fit to work. These are followed by periodic risk-based medical examinations during employment and an exit medical examination when an employee terminates employment at Rössing Uranium.

Other medical examinations during employment include transfer medical examinations and return-to-work fitness medical examinations. Through the mine's workplace wellness programmes, employees are encouraged to undergo additional medical screening tests to manage their own health and as a means of detecting chronic and/or life threatening illness.

In 2016 a total of 122 pre-employment, 764 periodical and 90 exit medical examinations were conducted on employees. A total of 871 pre-employment, 946 periodical and 212 exit medical examinations were carried out for contractors.

### Wellness

Our workplace wellness programmes are designed to help us create a working environment that is conducive to the health of our employees.

Encouraging employees to look after their health and well-being is a critical component of our overall approach to health and safety. The programmes also promote knowledge and awareness through campaigns and educational sessions which introduce policies that help employees make healthier choices.

Various activities were undertaken during 2016 to support these programmes.

#### Wellness week

Rössing Uranium's Wellness week, in collaboration with Namibia Health Plan (NHP), was held on site for the third consecutive year during August with the theme 'A healthier you, a brighter Rössing Uranium'. The programme included health screenings, awareness sessions on chronic illness management, mental health, diet and nutrition. A total of 174 employees (57 females and 117 males) received wellness screening during this week.

#### Alcohol and drug awareness week

The Wellness week was followed by an Alcohol and drugs awareness week. Sessions were presented by the Circle of Friends support group in various departments on the mine. A total of 407 employees and contractors attended these sessions.

#### Measles and rubella immunisation campaign

The Ministry of Health and Social Services, in compliance with the World Health Organisation disease prevention programme, conducted the



measles and rubella immunisations campaign nationwide on 26 July 2016. We organised and supported teams to perform these immunisations on site. A total of 422 individuals were immunised during these sessions.

### **Prostate cancer awareness and screening**

A total of 57 male employees received prostate-cancer screening by the Cancer Association of Namibia. These screenings consisted of prostate sonar and blood tests for prostate-specific antigen (PSA) levels. The employees were referred to their medical practitioners for advice on the screening report and further management where necessary.

### **Blood donation clinics**

The Blood Transfusion Service of Namibia held three blood donation clinics on site during which a total of 213 units of blood were donated. We received the Namibian Blood Transfusion Coastal Industrial Award (silver) at a special event in recognition of our employees' support.

### **Voluntary medical male circumcision**

Rössing Uranium supports the national campaign on voluntary medical male circumcision which was launched in September 2016 and will run over a period of 12 months. During 2016, awareness sessions were conducted internally and referrals of interested employees were coordinated through the office of the health advisor.

### **Employees knowing their HIV status**

In 2016 a total of 311 individuals, employees and contractors went on record as knowing their HIV status after attending voluntary counselling and testing sessions on site. These sessions were conducted by a non-governmental organisation, Namibia Planned Parenthood Association.

## **Radiation safety**

Radiation safety is a discipline involving both science and psychology. The science explains and quantifies the principles of interaction between matter and radiation, including the interaction of radiation with living tissue and potential biological effects from exposure to ionising radiation.

While the science is well understood, the risk perception and psychological effects of radiation on people are not as well established. Internationally, appreciation for the importance of appropriate communication about radiation risk is growing.

For public information, we provide a collection of reports, fact sheets and information pieces on our website ([www.rossing.com](http://www.rossing.com)), under the 'Reports and Research' tab. With these articles we provide information and analysis about some of the topics that tend to be close to people's hearts and on their minds.

Employees undergo a two-hour session about radiation and its associated risks when they accept employment on the mine, followed by regular refresher sessions thereafter, as well as specific information sessions for different working groups.

Via our intranet, each employee can access his or her dose records, which are reported annually to the Namibian Radiation Protection Authority. The intranet also provides urine sampling records via the same tool. These records remain anonymous, meaning employees only have access to their own records, via their log-on credentials.

### **Radiation exposure controls in place**

The concentration of the uranium in the rock we mine is low; hence the radiation levels in most areas of the mine are low.

The average personal exposure dose from natural background radiation in the Erongo Region is approximately 2 milli-Sieverts per annum (mSv/a), and dose levels at the mine are similar to this. Working at these exposure levels is not harmful to people, as the personal dose to workers is significantly lower than the legal occupational exposure limit.

Rössing Uranium has effective controls in place to optimise the exposures to ionising radiation to as low as reasonably achievable; these include engineering controls, respiratory protection, working time restrictions, hygiene facilities, clearance procedures and access controls.

Independent audits on radiation management are conducted by the Namibian Radiation Protection Authority, and bi-annual performance audits are conducted to check compliance with the Rio Tinto standard HO6-Radiation.

At Rössing Uranium, we grouped all workers into 22 similar exposure groups (SEGs). The exposure dose from ionising radiation is monitored randomly in each SEG by taking personal samples of the external (gamma radiation) and internal (radon and radioactive dust) dose in each group over several days.

The dose recorded for individuals is extrapolated to a full 2,000-hour working year and averaged for each SEG. This average dose is then assigned to every member of an SEG and reported to the Namibian Radiation Protection Authority annually. Exceptions to this process are Recovery workers and Final product recovery workers, for whom we have a continuous record of their gamma radiation dose.

The average dose when weighted over the entire workforce of the mine is close to 1 mSv/a, as has been confirmed for the past four years.

The mine-wide weighted average dose this year was established at 1.1 mSv per annum, when assuming on-the-job time of 2,000 hours in the year.



*Radiation protection officer, Colwyn Hoab, with a Thermo Elextra radiation contamination monitor which is used to scan flat surfaces for contamination.*



In 2016, there was only one worker whose total dose exceeded 5 mSv per annum; the highest individual annual dose recorded was 6.0 mSv. One urine sample exceeded an action level of 40 µg of uranium per litre of urine, but on investigation, the value was determined to be a false positive, as the sample had been diluted with water.

The average annual dose records for 21 different SEGs are summarised in Figure 9. The 22<sup>nd</sup> SEG is not included, as this group is comprised of workers off site and hence not exposed to ionising radiation from uranium on the mine.

The dust levels in the Final product recovery plant were higher than justified, and we have worked to reduce dust levels in the plant throughout the year. In particular, we have separated the drum filling area

physically from the rest of the Final product recovery area, thereby significantly reducing the potential for the inhalation of radioactive dust for people working in that area.

In addition to urine bioassays to check for internal contamination from ingesting uranium, the levels of radioactive surface contamination in the Final product recovery area are recorded weekly, and checked against compliance targets set for the area.

The target for 2016 was maintained at a maximum of 1.0 Becquerels per square centimetre (Bq/cm<sup>2</sup>). The annual average recorded for this area was 1.2 Bq/cm<sup>2</sup>, indicating that the target has not been met and emphasising the need for further work to reduce levels of dust and contamination in the area.

**Figure 9: Personal radiation exposure dose by similar exposure group (SEG), 2016**



### **Epidemiological study**

The epidemiological study about the potential health effects of uranium on mine workers, titled 'An epidemiological study of uranium mineworkers', conducted by a research team from the Centre for Occupational and Environmental Health at the University of Manchester, is progressing well.

We have collected information about the study cohort, ie all workers who were employed at the mine between 1976 and 2010 and who worked more than 12 months continuously.

We initiated collaboration with the Namibian Cancer Registry and the South African Cancer Registry, who will help to identify cancer cases for the study. At the mine we are working to quantify the occupational exposure of all workers in the cohort.

All data used in the study is anonymised to ensure that no personal information is conveyed to anyone, even the researchers. This is achieved by way of a data management protocol that ensures information is coded before it is transmitted for analysis.

An external advisory committee, consisting of members of the Mineworkers Union of Namibia, the Namibian Uranium Association, the Ministry of Health and Social Services and the Ministry of Mines and Energy, has been appointed to provide community oversight and input to the project.

Regular updates and information sessions are held with the external advisory committee and with interested stakeholders from the Erongo Region. Employees receive regular updates via our internal newsletter, the eRössing Bulletin.

The collection of data and subsequent analysis is expected to take approximately two years, after which the study will be submitted for publication in the internationally peer-reviewed scientific literature.

### **International Radiation Protection Association conference**

In 2016, the International Radiation Protection Association held its 14<sup>th</sup> conference in Cape Town. Rössing Uranium's principal advisor: Radiation Safety, Dr Gunhild von Oertzen, presented a paper titled 'Public dose assessments for atmospheric pathways at Rössing Uranium mine', utilising direct-monitoring data, and familiarised herself with the latest international developments in radiation protection.

### **Radiation safety officers training**

In order to reinforce the importance of radiation protection and the skill-base required for a comprehensive radiation-protection programme, Rössing Uranium continues to support and contribute to the training programme for radiation safety officers offered at the Namibian Uranium Association's Uranium Institute.

Several training courses were offered once again for radiation safety officers, including the popular annual two-day radiation safety officers workshop which brings industry experts together to share ideas and information about contemporary issues in radiation safety.

### **Safety in our operations**

Rössing Uranium places great importance on safety issues in all areas of its operations and we continuously focus on creating an accident-free workplace. We maintain that all incidents, injuries and occupational illnesses are preventable and our goal is therefore zero harm. Our safety aims and objectives are formulated to encourage employees to behave in ways which project a positive and proactive attitude regarding safety.

In line with the Rio Tinto Safety strategy, Rössing Uranium continued the three-pronged approach to managing safety in our operation, namely fatality elimination, injury reduction and catastrophic event prevention.

Acting on this approach, a number of safety milestones were achieved in 2016. The mine scored an impressive rating of 2.41 against the Rio Tinto Group target of 2.0 in the on-boarding phase of its fatality elimination initiative, ie Critical risk management.

The second milestone achieved was the leveraging on the potential fatal incident indicator in which the mine managed a 30 per cent reduction in the number of potential fatal incidents reported compared with the previous reporting year. (Seven were reported in 2016, ten in 2015.)

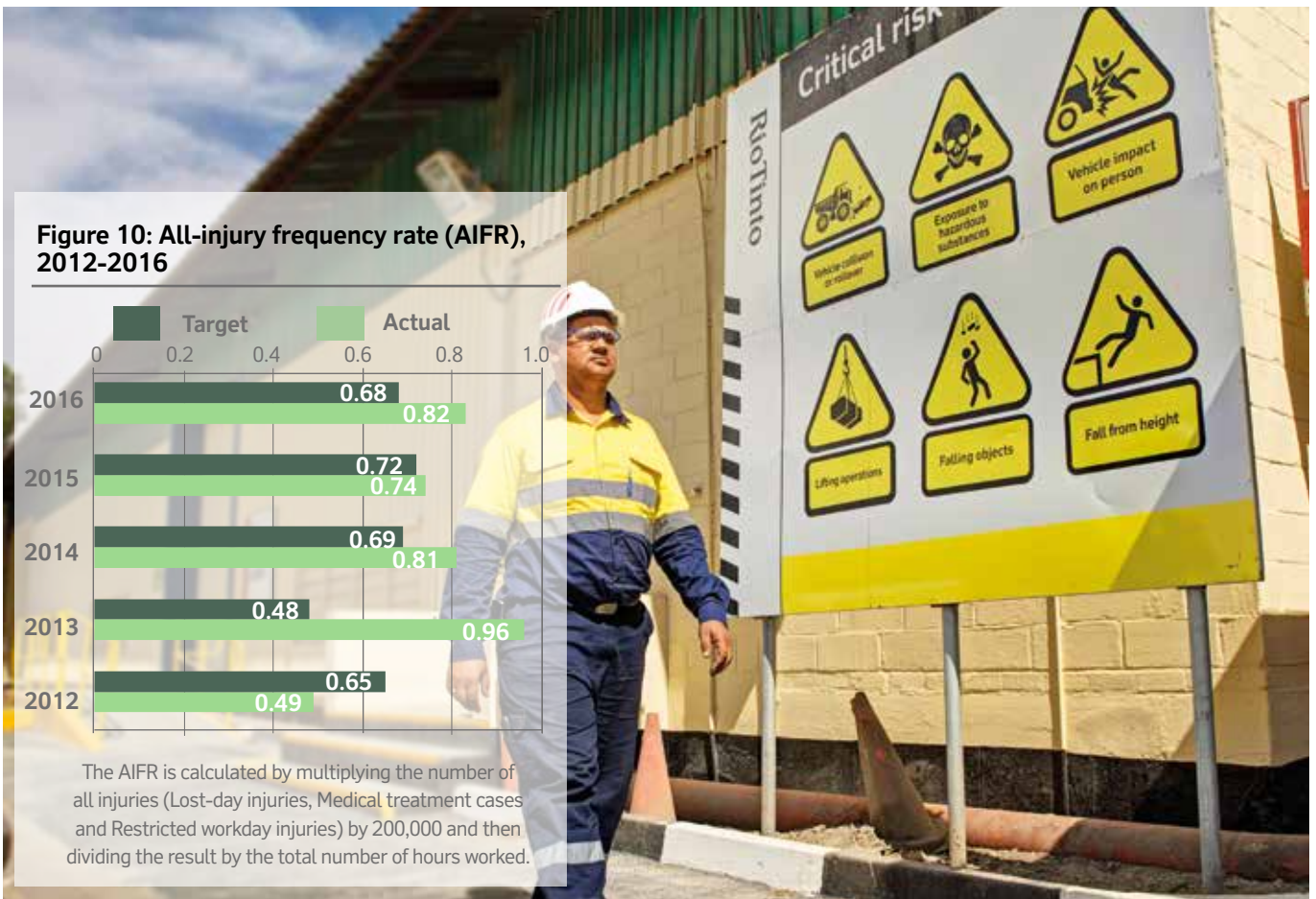
In addition, investigation training for superintendents and managers conducted in 2016 produced further improvements in the quality of the investigations, specifically in defining 'root causes' in order to implement sustainable actions to avoid repeated incidents. As a result, the mine experienced no repeats of the same incident due to a diligent review of the critical controls inherent to this process.

Finally, the severity of injuries experienced was reduced by 28.5 per cent with the reduction in lost-day injuries from seven in 2015 to five in 2016. Although these milestones brought the mine closer to our zero-harm goal, sufficient improvement was not demonstrated in reducing the number of injuries.

The following injuries occurred on the mine during the reporting period:

- Lost-day injuries: 5
- Medical treatment cases: 10
- Incidents requiring basic first aid: 29





Consequently, we recorded an All-injury frequency rate of 0.82 which is 11 per cent higher than the 2015 All-injury frequency rate of 0.74, as depicted in Figure 10.

We maintained vigilance to ensure that everyone goes home safe and healthy each day and introduced further improvements in our safety management systems and processes through focused attention on the following factors in 2016:

- strengthening our systems with internal auditor training for our health, safety and environment (HSE) personnel;
- a revised, simplified *Take-5* booklet that brought critical risk management closer to the workforce;
- inclusion of critical risk management in our ‘safe work procedure’ process;
- light vehicle/heavy mobile equipment segregation, specifically in the Open pit;
- review of the vehicles and driving safety standard of Rio Tinto and improvements in the angle iron fixtures in parking bays to prevent uncontrolled movement of vehicles, ensuring fundamentally stable parking;
- standardising our leadership-in-the-field approach ensuring that all leaders apply it in the same manner;
- conducting critical-lessons workshops to ensure that critical lessons are cascading down to all team members; and

- reviewing all our safety standards and integration of the Rio Tinto Group requirements in all our safety systems and procedures.

Our journey on the path of safety continues. In 2017, we will focus attention on the following areas to bring us closer to the goal of zero harm:

- frontline leadership development (in-field coaching);
- continued effort to reduce or eliminate light vehicle/heavy mobile equipment and pedestrian interaction;
- facilitated learning and focus to eliminate repeat incidents, including potential fatal incidents;
- a rail safety review with appropriate improvements;
- alignment of our process safety management standards to Rio Tinto standards;
- firmly embedding critical risk management in our operations;
- creation of an operationalised and embedded management of change process; and
- creation of a learning and engaging environment through our *Call-to-Action* initiative.

(Above) Warehouse officer, Gaston September, at the Critical risk signboard at the mine's Central store.



*Paulo Samuel, Rössing Foundation education officer. Science, and learners at the mobile laboratory which was deployed to support rural schools where tuition of Mathematics, the Sciences and English is often hampered by a lack of facilities.*



# Neighbouring communities

**Rössing Uranium's corporate vision transcends the scope of mining. We understand that, in order to be successful, we must support the advancement of communities by making contributions of value in the environment in which we operate.**

We strive to build enduring relationships based on open, respectful, and trustworthy communication, which promote better understanding of our impact on the social and physical environment and ensure a significant contribution to economic and social development.

Since establishment as Namibia's first uranium mine 40 years ago, we acknowledge that operating within a sustainable community provides our business distinct benefits, such as skilled and locally-available employees; capable, local suppliers of goods and services; access to sustainably managed natural resources; and healthy and safe environments for our employees and their families.

With these ends in mind, we implement long-term, community development plans that focus on improvements in the quality of life. In 2016 we continued successful efforts to maintain these mutually-beneficial relationships.

## Community relations

Despite facing various production and market challenges during 2016, we remained steadfast in honouring our corporate social responsibilities. We accomplished this goal through continued and generous investment supporting sustainability of neighbouring communities.

We align our community and social investment focus with the requirements of Namibia's Mining Charter. The charter, overseen by the Chamber of Mines of Namibia, is aimed at positively and proactively addressing sustainable and broad-based economic and social transformation in the Namibian mining sector and is grounded in key Government policies such as Vision 2030, the National Development Plan 4 (NDP4) and the Harambee Prosperity Plan. Throughout 2016 we ensured accountability by tracking our compliance against the charter's targets.

During the year under review, we committed more than N\$15.4 million towards the implementation

of community initiatives and activities. This is over and above the direct and indirect economic benefits we created through local employment and the procurement of goods and services from local businesses. Most of our community and social investments are channelled directly through the Rössing Foundation, but the mine also supported various community-investment initiatives directly.

Because we pro-actively promote healthy, safe and environmentally-responsible lifestyles amongst our neighbouring communities, we also made direct contributions to initiatives targeting:

- biodiversity protection through support of the annual bird-watching event,
- rescue and replant several plant species of importance in the context of conservation;
- healthy living by way of the annual Rössing Marathon National Championship and Fun Walk in aid of the Cancer Association of Namibia;
- promote awareness of personal health and HIV/Aids; and
- conduct waste-management activities at local primary and secondary schools.

The three-year safety awareness initiative, designated as the *Project Safety W.I.S.E.*, which we implemented in partnership with AREVA Resources Namibia and the Directorate of Education, Arts and Culture of the Erongo Regional Council in 2015, continued throughout 2016. This initiative supports the creation of a culture of safety among primary education learners in Arandis, Swakopmund and Walvis Bay.

The initiative is built on the belief that if learners are exposed to safety awareness in small but progressively increasing amounts throughout their education, safety consciousness will become an integral part of their lives.

*(Right) Visitors to the mine's Dr Hage G Geingob viewpoint, overlooking the Open-pit operations.*



We continue to provide support for other initiatives such as the Erongo House of Safety in Swakopmund through our partnership with the Erongo Development Foundation, the Swakopmund Museum, the West Coast Safety Initiative and the Arandis Emergency Response Management Centre.

Recognising the devastating effect of severe drought on the lives of thousands of people and cattle in most parts of Namibia this past year, the mine donated N\$100,000 to the drought-relief programme in the Erongo Region.

In addition to financial contributions, we directed our employees' technical expertise to engage with the public and with community-based organisations to increase health, safety and environmental awareness within the Erongo Region.

One such activity is radiation safety training, offered to the public in collaboration with the Namibian Uranium Institute. We also provided expertise for the Namibian Uranium Association on water management issues to reduce the mining sector's footprint on regional water resources.

### **External and internal communication activities**

Rössing Uranium's Corporate communication section has various platforms and activities in place to initiate and maintain good relationships and promote the sharing of information about our operations with stakeholders. Stakeholders include our employees and contractors, as well as people outside the company.

During 2016 various strategic communication activities were implemented to disseminate information about Rössing Uranium via a variety of channels in the print and electronic media, as well as by means of face-to-face communication.

A key area of focus in 2016 was the mine's 40<sup>th</sup> anniversary in mining operations. Key messages sought to raise awareness of Rössing Uranium's role in the community but also to inform the public that our business provides a strong base for economic growth in the community as a whole. Another aim is to promote the view that our business is a responsible mining operator in Namibia and has been for the past 40 years.

Our visitors' programme is a key means of engaging guests from around the world. Besides members of the public, the programme welcomes specialists, academics, and Government officials. In 2016, we hosted 48 tours at the mine for a total of 738 visitors.

A highlight of the visitors' programme was the visit of His Excellency Dr Hage G Geingob, President of the Republic of Namibia, on 25 August 2016, as part of the mine's 40<sup>th</sup> anniversary celebrations.

We have continually provided information about our operations to the Namibian Government to keep it well-informed. This programme of external affairs was conducted by the mine's senior management which engages politicians and senior officials of the Government of Namibia on matters of mutual interest.

A number of stakeholder engagement events hosted during the year for the Namibia business community shares information about our business performance.

Media relations were facilitated through response to media enquiries, and through invitations to a number of information-sharing events. The latter promoted the strengthening of our relationships with the media and facilitated balanced coverage of our operations and business activities.

Other communication activities involved a variety of external stakeholders. We hosted the 16<sup>th</sup> annual Rio Tinto Rössing bird-watching event, which is part of the larger partnership between Rio Tinto and Birdlife International.

The company also hosted the 25<sup>th</sup> Rössing Marathon National Championship, which attracted approximately 250 athletes. The competitors participated in a marathon and a 10-km race, while a 5-km Fun Walk was held in support of the Cancer Association of Namibia.

In 2016 cash and in-kind sponsorships and donations initiated through the Corporate communications section totalled N\$462,700.





*(From top to bottom, left to right)  
In 2016 the Rössing Marathon National Championship was hosted for the 25<sup>th</sup> consecutive year; employees participated in intermines' sport event; the Rössing Foundation awarded certificates to SME trainees; husband and wife team Reonard Namupala and Alina Armas made history when they won the 2016 Rössing Marathon National Championship; and Rössing hosted its bird-watching event for the 16<sup>th</sup> consecutive year.*



# President of Namibia visited Rössing mine

**Rössing Uranium is proud to have welcomed His Excellency Dr Hage G Geingob, President of the Republic of Namibia, to the mine in August 2016, on the occasion of our 40<sup>th</sup> anniversary celebration and to open a new viewing point at the Open pit named in his honour. President Geingob was accompanied by the First Lady, Madam Monica Geingos.**

President Geingob's presence at the mine marks a milestone for Rössing Uranium, as all three Namibian presidents have visited the mine. In July 1990 Namibia's first president and founding father, Dr Sam Nujoma, visited the mine and in 2009 we welcomed former president, Hifikepunye Pohamba.

As part of the celebrations, the mine honoured the President by naming the mine's new viewing point the Dr Hage G Geingob viewing point. This is a vantage point at the Open pit which is visited on a regular basis by international tourists and Namibian visitors.

During his welcoming address, managing director Werner Duvenhage emphasised the importance of our visitors' programme as a tool used to foster and celebrate collaboration with neighbouring communities and to share information with all our stakeholders.

"Each year Rössing Uranium hosts many visitors to the mine, including Government and business leaders, industry peers, students, members of the general public, tourists and employees' families. The main aim of this programme is to show that the mine's activities are transparent, in particular with regard to our HSE standards and practices. This helps us drive superior performance," he said.

President Geingob mentioned that he has observed how the mine is a true investment to the country's economic development. Besides the mine's contributions to the local economy, the President commended Rössing Uranium for the investment it has made in skills development for Namibians, who have found work on the mine or elsewhere in specialised fields.

"We do not eat uranium, but others can use it for their specific reasons. What we can do is partner with such investors and ensure a conducive environment is available for them to invest in and so plough back into our economy to the benefit of our people," said the President.

His visit to the mine coincided with national celebrations of Heroes' Day. The managing director introduced Rössing Uranium's own heroes and heroines to the President and his entourage, the long-service award recipients and young graduates of 2016, who will take the mine into the future.







## The Rössing Foundation

The Rössing Foundation was established in 1978 through a Deed of Trust as a vehicle to oversee the mine's corporate social responsibility activities in Namibia.

The Foundation focuses mainly on programmes which target:

- the improvement of primary and secondary education through the implementation of various teachers' and learners' support programmes;
- the development of a local workforce and specialised vocational skills through the provision of scholarships, apprenticeships and part-time study opportunities; and
- the diversification and strengthening of the local economy through support of small- and medium-scale enterprises.

All the activities that the Rössing Foundation drives or supports are formulated in a Memorandum of Understanding between the Foundation and partner organisations, but in particular the seven education directorates.

### Education programme

The Rössing Foundation has been working in partnership with the Ministry of Education, Arts and Culture since Namibia's independence in 1990. The partnership encompasses activities such as strengthening the capacity of teachers and learners, leadership and management programmes, resource sharing and exchanging expertise between the partners.

To address education challenges facing Namibia, the Rössing Foundation assists the Government of Namibia through the Ministry by availing opportunities to teachers and learners to acquire subject-related knowledge for the development of competencies in English, Mathematics and the Sciences.

To this end, the Rössing Foundation built and operates three state-of-the-art education centres in the towns of Arandis and Swakopmund in the Erongo Region, and in Ondangwa in the Oshana Region.

In addition to these three centres, the Rössing Foundation initiated an innovative undertaking: the introduction of a mobile education laboratory.

This laboratory vehicle, fully equipped with the required materials and equipment, was introduced in late 2015 and travelled to many outlying areas of the country. This operation greatly benefitted rural schools, as many teachers and learners cannot afford to travel to the centres. (See case study on pages 46-47.)

The centres and mobile laboratory will continue to serve as the hub of support programmes, not only for learners and teachers, but also for neighbouring communities.

### Teachers' support programmes

Rössing Foundation regards support for teachers to be vital, as a single, well-equipped teacher is able to benefit up to 30 learners. Teachers' support programmes are conducted either at a centre or through the mobile unit on school visits to rural areas.

During 2016, 645 teachers at the Arandis, Ondangwa and Tamariskia (Swakopmund) centres received professional development support which included one-on-one coaching, workshops and co-teaching at local schools.

Teachers from, Arandis, Omaruru, Henties Bay Swakopmund and Walvis Bay in Erongo Region; Fransfontein in Kunene Region; Outapi in Omusati Region; Otjinene in Omaheke Region and Sikosinyana in Zambezi Region received support through the A-Z reading programme, also focussing on literature content, debating skills and loans of Science equipment at the centres and at schools. Teachers also received training in pedagogical subjects, as well as in the design and development of practical investigation worksheets, lesson planning and judging projects.

Since the national syllabi in some subjects have been changed, the Rössing Foundation as a partner to the Ministry of Education, Arts and Culture, was called upon to co-facilitate the training of Mathematics teachers to prepare them for the implementation of the new syllabus.

The Foundation also participated in the Sciences teachers' review workshop on the new syllabus for Junior Secondary certificate (Grades 8 and 9) held in Swakopmund.





### Learners' support programmes

The centres remain popular among learners. During 2016, the Arandis and Tamariskia (Swakopmund) centres supported a total of 3,745 learners in these towns. The Ondangwa centre assisted a total of 1,986 learners in English, Mathematics and the Sciences.

The learners received tutoring in theory, and were exposed to practical activities in Mathematics, Sciences and English, activities such as scientific experiments, debates, a computer-based Master Maths program to deepen their understanding of the subject and to improve their retention capacity of lessons learned at schools.

During the school holidays in May and August, learners from Omusati, Zambezi and Kunene regions spent a full week at the Swakopmund centre for tutoring, while the SI Gobs Secondary School learners from Omaruru in Erongo Region spent a week during both holiday breaks for tutoring in content support and revision in preparation for the year-end examinations. In addition, 194 learners attended holiday classes at the Ondangwa centre.

The Foundation also provided support for the Mondesa Youth Opportunities organisation when they held a 'Spelling Bee' competition at Swakopmund's Coastal High School.

### Library services to the community

The main purpose of the Rössing Foundation's libraries is to ensure that learners, teachers and other community members have access to information through books. Improved reading skills are conducive to good results at school and deepen general knowledge as well.

The Rössing Foundation libraries are located in the vicinity of the communities they serve. Learners and other members of the communities of Arandis and Swakopmund make use of the libraries on a daily basis.

Visits to the libraries always exceed targets, which is a good indicator of book circulation. The two libraries in Arandis record high numbers of books borrowed and returned, indicating an active reading culture in that community.

In 2016, 25,497 learners, 1,131 teachers and 10,515 community members visited the libraries in Arandis, Ondangwa and Swakopmund. A total of 11,062 books were borrowed and 6,856 returned by end of December 2016.

During 2016, an utilisation survey of Rössing Foundation libraries was conducted to hear users' views and perceptions.

The results showed that the libraries are important resources for the communities. However, users also indicated that upgrades of the library resources were necessary in all libraries to attract more memberships.

*(Above) The Rössing Foundation junior library in Arandis, frequented by learners after school.*



*(Above) The Dreamland gardening project, supported by the Rössing Foundation, continues to grow thanks to the dedicated care and management of Theresia Augusta (left) and Elizabeth Makina (right), chairperson of the project.*

The Rössing Foundation also assisted the Namibia English Teachers Association (NETA), comprised of senior education officers and local teachers, to revive the network.

The association aims to have the coastal-based NETA fully operational in 2017 and strives to amalgamate regional NETAs into a national organisation.

### **Enterprise development support**

#### **Ûiba-Ôas Crystal Market**

For the past ten years, Rössing Foundation supported the small-scale miners in the Erongo Region, most of whom operate from the Ûiba-Ôas Crystal Market situated on the main road between Usakos and Karibib.

With the support of the Foundation, a grant was secured from the Social Security Commission's Development Fund to build a cutting-and-polishing workshop, to purchase a cutting-and-polishing machine and to train two members in its operation. Having the facility on site enables them to maximise their potential to turn a profit.

The initiative was so successful in 2016 that the members recognised the need to purchase a stone-cutting machine and to train more members on the cutting-and-polishing machine.

The miners are currently seeking funding to achieve these objectives.

Rössing Uranium also covered the cost of reprinting 10,000 tourist brochures which explain how to obtain a licence to export gemstones purchased at the market.

With assistance from the Foundation team, the Ûiba-Ôas Co-operative management team is currently working on an update of the business plan, as well as preparing user guidelines for the cutting-and-polishing machine.

During the course of the year the Rössing Foundation offered computer skills training and online marketing, including how to update the market's Facebook page.

In addition, the Foundation hosted and facilitated an off-site planning session for the co-operative's management team to help them optimise returns on gains made in recent years to the benefit of all members and the future of the co-operative.



### Support to community agribusiness

Launched from proverbial humble beginnings with support from the Foundation, the Dreamland Garden project in Arandis continues to grow.

As in the case of the Ôiba-Ôas Cooperative, the Foundation supported the project team to secure grants from Social Security Commission's Development Fund (SSC-DF). Grants provided in 2013 had enabled the garden project to expand substantially in subsequent years. Most of the fresh produce from the project is sold in Karibib and Swakopmund markets.

The Rössing Foundation and SSC-DF continue to support the project team, providing agribusiness mentorship by way of face-to-face consultation and informal training, counselling and providing advice on record keeping, long-term planning and business operations, as well as strengthening retention of newly-acquired skills.

During 2016, a washing room to prepare produce for the market was built, funded by the SSC-DF. The water used to wash the vegetables is being recycled for gardening purposes. In addition, a dry, environmentally-friendly toilet facility was erected at Dreamland Garden.

### Support to Ohungu Conservancy

The Rössing Foundation, together with the Ministry of Environment and Tourism, sent observers to the Ohungu Conservancy annual general meeting which was attended by over 70 people.

The management committee reported on progress made by the conservancy and on the challenges it experienced. Challenges included the drought conditions, the growing number of poaching incidents, a lack of cash flow, and the delay in completion of the community lodge.

A grant application to the Environmental Investment Fund of Namibia has been submitted with support from the Foundation team and the outcome is awaited. The grant would assist the conservancy to upgrade water infrastructures, improve wildlife monitoring and accessories for monitoring the conservancy area in order to curb incidents of illegal hunting of wildlife.

### Support to small- and medium enterprises

During the course of the year the Rössing Foundation offered Arandis residents a six-week training course to develop basic business skills in product development, bookkeeping and finance. The ten participants were assigned to complete a business plan based on what they had learned in the training.

Due to strong local interest, the Rössing Foundation also offered two four-week courses to entrepreneurs and others interested community members in improving their English language skills.

To celebrate their success, the Rössing Foundation hosted a graduation ceremony for the trainees. Regional Councillor, Benitha Imbamba; the Mayor of Arandis, Risto Kapenda; and the executive director of the Rössing Foundation presented certificates to 23 Arandis residents who completed the training.

In addition, a team consisting of Rössing Foundation representatives and a United States Peace Corps volunteer travelled to Mpungu in Kavango West Region to facilitate a financial skills workshop for local entrepreneurs, prospective entrepreneurs and community leaders. The initiative was well received and 20 participants attended each day.

The Rössing Foundation would like to thank stakeholders in partnership who made our work possible: the Ministry of Education, Arts and Culture; the Ministry of Mines and Energy; Arandis Town Council; Erongo Development Foundation; the United States Peace Corps; the Social Security Commission; the National Institute for Educational Development (NIED); the United Nation's Children Fund (UNICEF); the Erongo Regional Council; local schools and the communities in which we operate.

## Case study: Mobile education laboratory

# First successful year for mobile education laboratory

**The Rössing Foundation's first mobile education laboratory completed its first, highly successful year, visiting 33 schools in eight regions and surpassing the targeted number of learners and teachers to be reached by more than 150 per cent.**

The Rössing Foundation's three education centres in Arandis, Ondangwa and Swakopmund mainly benefit teachers and learners living in the vicinity of the towns where the centres are located. Transport and related costs are often too high for the centres to benefit those living far away from these towns. As a result, many rural schools poor in teaching and learning resources miss out on the valuable opportunities offered by these programmes.

The mobile education laboratory was initiated as a method to expand Rössing Foundation's reach to outlying schools in support in English language training, Mathematics, and the Sciences.

With sponsorship from Nedbank Namibia, a mobile van was purchased and equipped with materials that support teaching and learning of these subjects. These materials help learners to conceptualise content central to their respective curricula through practical application in real-life situations. At the same time, where applicable, teachers were trained in classroom skills, subject-content knowledge and material-development skills.

A team ranging in size between seven and nine education officers from Rössing Foundation assisted 33 schools in 2016. Each school

was visited twice during the course of the year and training was conducted over four days. In the first visit to a region, a launch was held at one of the visited schools in which the project and sponsors were introduced to communities, businesses and all beneficiaries.

Regions visited during this reporting period include Erongo, Hardap, Ohangwena, Omaheke, Oshikoto, Omusati and Zambezi.

*During 2016, the mobile unit visited 33 schools, supported 10,604 learners and 882 teachers against a target of 4,500 learners and 310 teachers.*

Asked about the reaction of learners and teachers at the schools visited by the mobile laboratory, **Paulo Samuel**, Rössing Foundation education officer: Science, said: "The atmosphere at virtually every school was one of amazement and awe. One could see so many questions written all over the teachers' and learners' faces. The mobile laboratory was definitely an intellectual brainwave!"

**David Ajayi**, Rössing Foundation education officer: Science, concurred: "The learners at every school we visited were fascinated with the Science experiments and many told us that it helped them tremendously to get a better understanding of the theory. The teachers are equally excited — while the school may have Science equipment, many teachers lack the confidence to use it, but after one of our visits, they tell us that they now feel confident."





# The launch at Mpungu of the outreach programme in Kavango West Region

In 2017, the programme will begin operation in the Kavango West Region for the first time. Launching the partnership between the Educational Directorate in collaboration with the Regional Council and Rössing Foundation, a celebratory event was held at the Himarwa lithete Secondary School at Mpungu in February 2017.



*"We are grateful that Rössing Foundation brought us something that we have never had, seen, heard of before and of which we never had an idea of. We are really thankful for that. We feel honoured that out of the whole Kavango West, our school is one of the selected ones to be assisted academically."*

**Mr Frans Nambase**

Chairperson of the Himarwa lithete Secondary School Board

*"Nedbank Namibia feels honoured and privileged at the opportunity to have partnered with the Rössing Foundation to bring the educational mobile van to rural schools across our country. It is hoped that the outreach programme will continue to inspire learners and teachers, as we have seen the difference it has made through sharing practical skills and knowledge that supplement the class programme."*

**Ms Mwahala Ya-Kalimbo**

Nedbank Namibia branch manager, Rundu

*"To be honest, I was not expecting what I am seeing now. I expected teachers to come and assist us but now that I have seen the mobile lab, I have an idea of what to expect and my expectations are totally met now. On behalf of my school, I would like to say, thank you very much, and we promise to do our best to dedicate our time towards the programme so that at the end of the day no one will be left behind."*

**Mr Alexander Kudumo**

Principal, Leevi Hakusembe Senior Secondary School

*"We thank Rössing Foundation for providing necessary support to the management, teachers and learners at the four identified schools in Kavango West. Your support will enable educators to provide nurturing and stable learning environments that lead to effective teaching and positive outcomes."*

**Hon. Councillor Titus Shuudifonya**

Chairperson of the Regional Council

*"You have really helped us to carry out practical Science application. Thank you very much!"*

**Mr Brinly Streightwolf**

American Peace Corps volunteer teacher at Himarwa lithete Secondary School

*"These materials are very nice; you can carry them around and conduct experiments in an ordinary classroom."*

**Mr Jona Mushelenga**

Education officer: Physical Sciences, Rössing Foundation

# The environment in which we operate

**As a resource-intensive industry, Rössing Uranium's operations impact on natural resources and the environment. For this reason, the mine evaluates, plans and manages such impacts on an ongoing basis and at all stages of its activities. We continually report on our environmental performance in a transparent manner.**

Every year, as part of our continuous improvement focus, we set demanding goals for ourselves for the efficient use of water. We acknowledge the importance of caring for the ecosystems and biodiversity in the areas where we operate.

Likewise, we are aware that sustainable growth requires an effective response to climate change. As a significant uranium producer and consumer of energy, we are committed to reduce greenhouse gas (GHG) emissions.

Measurement of performance against our objectives and plans is discussed in the subsequent pages.

## Water management

Rössing Uranium is conscious of the fact that water is a precious resource; and because the mining industry is typically a large water user, water conservation measures at the mine are taken seriously.

As the mine is located in the Namib Desert, water management is a one of the most crucial environmental and operational focus areas of our activities. Water management includes all aspects of groundwater pumping, seepage management as well as storage, reuse and recycling of surface and groundwater.

Guiding Rössing Uranium's Water management plan is a formal Water strategy which was developed according to Rio Tinto's performance standards and guidelines. The aim of the plan is to ensure efficient, safe and sustainable use and protection of water resources and ecosystems.

A cornerstone of the mine's water and seepage management is our comprehensive monitoring programme, which begins at the Tailings storage facility, extending to the Khan River and Swakop River.

Since 1980, we have been recycling 60 to 70 per cent of our water which is indicative of an effective water management strategy.







*Water management at Rössing Uranium includes all aspects of groundwater pumping, seepage management, as well as storage, reuse and recycling of surface and groundwater. One of the water-monitoring points in the Panner Gorge in the mine's licence area is tested by geohydrologist, Stefaans Gaeseb, and operator, Water Management, Jeremy Keister.*



(Above) Most of the mine's water management takes place at the Tailings storage facility where water from the facility is captured in storage ponds and returned to the Processing plant.

To best manage and optimise our water savings we use frequent flow-meter readings taken at various points in the Processing plant to provide a continuous overview of our water balance data. All spillages in the Processing plant are captured and channelled to a large recycle sump for reuse. Effluents from the workshops are treated to remove oils, and sewage is treated in the onsite sewage plant. These purified effluents are used in the Open pit for dust control purposes.

Figure 11 shows an overview of the 2016 water balance, specifically the recycling of water from the Tailings storage facility to the Processing plant.

Our operating plan of 2016 set a target for freshwater usage of 2.9 million cubic metres (m<sup>3</sup>) supplied by NamWater. The actual consumption of fresh water came to only 2.1 million m<sup>3</sup> in 2016.

As was the case in the previous reporting year, the freshwater use for 2016 was lower than anticipated. This lower consumption in water usage was primarily attributable to lower processed tonnes against the operation plan in the plant, as well as to water-saving efforts that was instituted on the mine, for example the installation of mechanical seals which reduces the use of fresh water in slurry pumps.

The bars in Figure 12 show that the actual monthly freshwater used was lower than planned during most months in 2016. This relates to the line graph in Figure 12 which shows the water consumption rate for one tonne of ore milled.

For that rate an annual target of a maximum of 0.30 m<sup>3</sup> per tonne ore milled was set for 2016. For most of the months this target was achieved.

The lower consumption in freshwater usage was primarily attributable to lower processed tonnes against the operation plan in the plant, as well as to water-saving efforts that was instituted on the mine.

Figure 12: Freshwater use per month, 2016

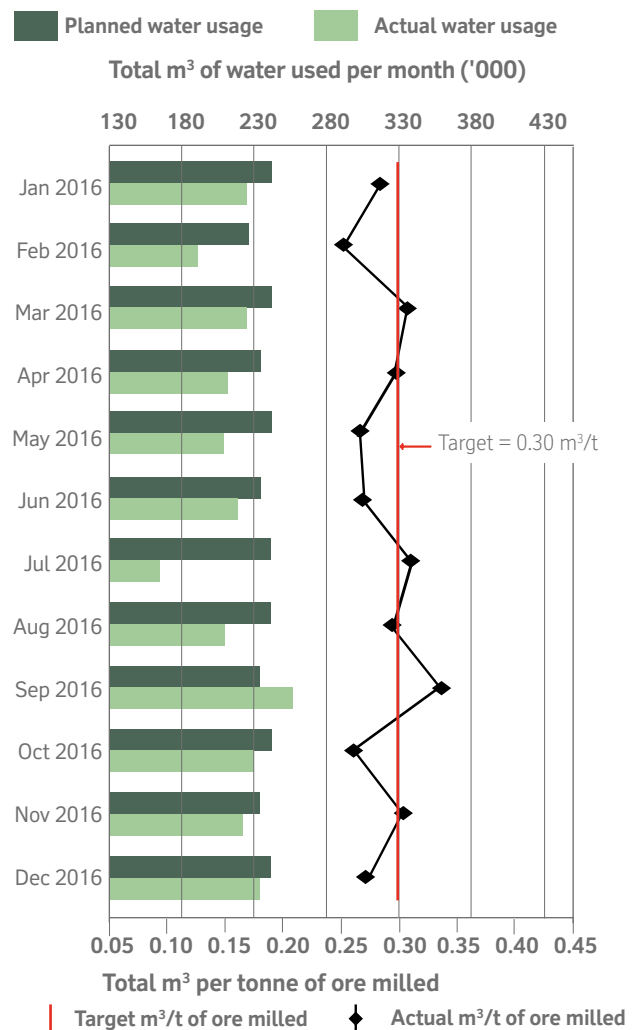
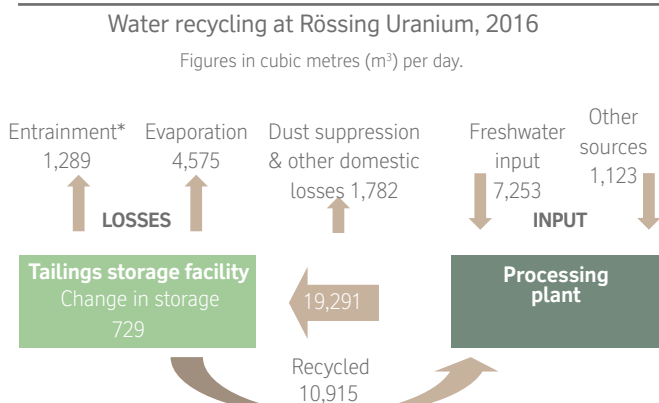


Figure 11: Overview of Rössing Uranium's 2016 water balance



\* Water entrainment is the permanent loss of water to the pore spaces of the tailings material and is not recoverable anymore.

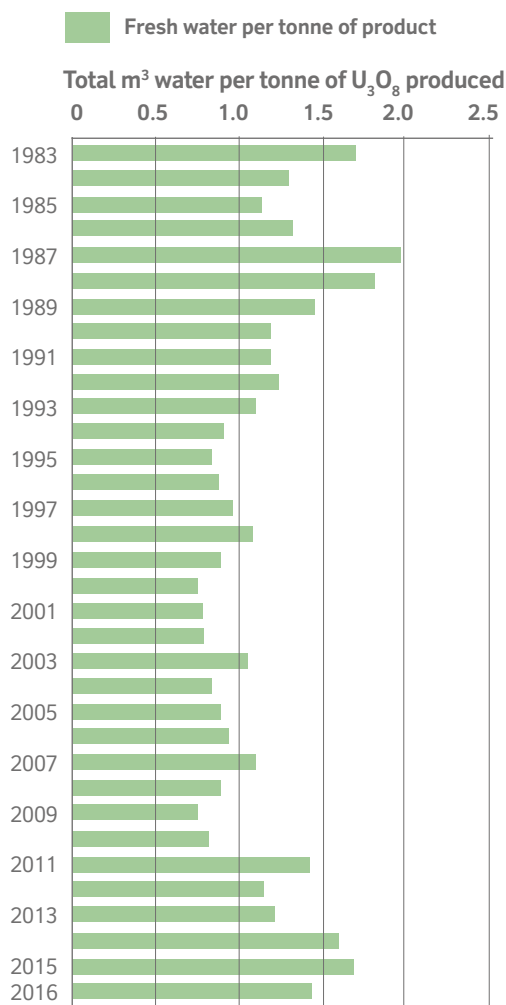




Another measure of efficiency is the volume of fresh water consumed per tonne of uranium oxide produced. Performance between 1983 and 2016 is indicated in Figure 13. The increase in freshwater-

The increase in freshwater-usage rate per tonne of uranium oxide produced in the last few years is explained by lower ore grade, which requires more ore to be milled to achieve the same uranium oxide production output.

**Figure 13: Volume of fresh water consumed per tonne of U<sub>3</sub>O<sub>8</sub> produced, 1983 to 2016**



usage rate per final product produced in the last few years is explained by lower ore grade, which requires more ore to be milled to achieve the same uranium oxide production output.

Demand management of fresh water remains a key challenge for us, with issues relating to periodic interruptions in supply from the bulk water supplier, interruptions in the functioning of pumping systems, unavailability of spares parts, and a lack of adequate storage capacity for the water recycled.

In view of these factors, various campaigns were launched to heighten awareness among employees and contractors concerning the reduction of demand and responsible consumption throughout the year.

During the reporting year we continued our internal 'Water Bucket'-awareness campaign published in our in-house newsletter, the e-Rössing Bulletin, to flag critical issues for all water users.

**Desalination**

In June 2016, the environmental clearance certificate for the construction of Rössing Uranium's own desalination plant at Mile 4 close to Swakopmund, was received from the Environmental Commissioner's office of the Ministry of Environment and Tourism.

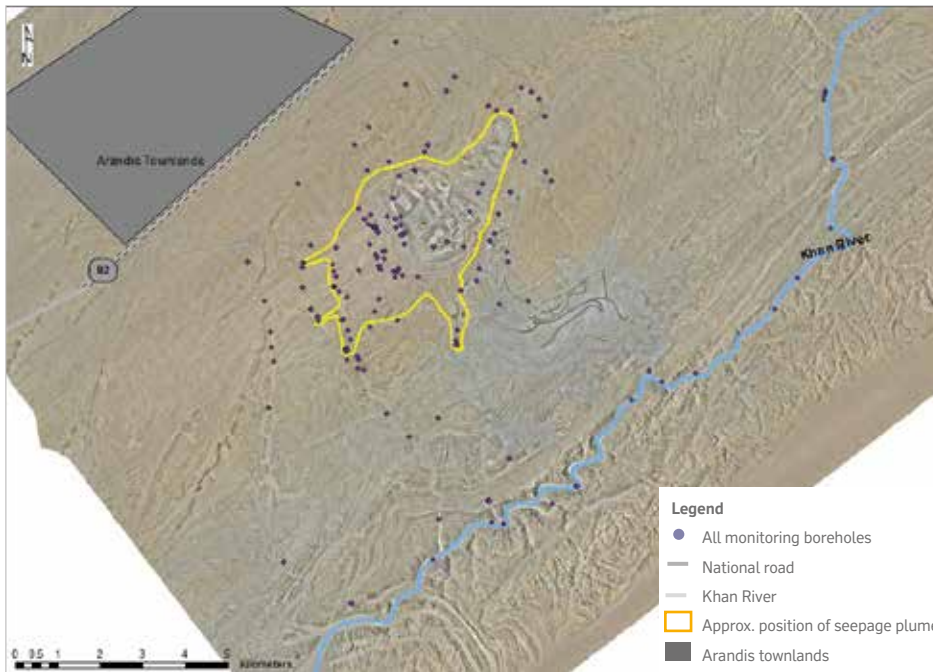
To meet prerequisites for receipt of the certificate, Rössing Uranium applied for the water permits required by the Directorate Water Resources Management of the Ministry of Agriculture, Water and Forestry in September 2016. No reply from the directorate had been received by the end of 2016.

The current cost of water is high and the mine remains open to implementing alternative measures to reduce the cost of desalinated water.

**Khan River water use**

Rössing Uranium resumed its abstraction of saline groundwater from the Khan aquifer following the encouraging rainy season of 2011. The groundwater is sprayed on the haul roads in the Open pit to suppress dust.

Such abstraction continued under the permit issued by the Directorate Water Resources Management. The mine will apply for an extension of the permit early in 2017.



(Above) The map shows the approximate position of the seepage plume around the Tailings storage facility and the location of water sampling points.

A total of 134,265 m<sup>3</sup> of Khan River water was abstracted during 2016, which is 15 per cent of the permitted abstraction of 870,000 m<sup>3</sup> per year.

We continue to monitor the vegetation and water levels in the Khan River to prevent over-abstraction.

In compliance with conditions of the abstraction permit, annual reports derived from the water and vegetation monitoring programme are sent to the Ministry of Agriculture, Water and Forestry's Directorate Water Resources Management.

**Water quality management programme review**

Towards the end of 2015 Rössing Uranium embarked on a project to improve the mine's water quality management programme which includes the water monitoring aspects, as well as seepage water recovery.

The aim of the project is to maintain an effective seepage recovery system for the future. The seepage recovery system prevents tailings solution to flow towards the Khan River. The map above shows the approximate position of the seepage plume around the Tailings storage facility in 2016, nearly 5 km to the northwest of the Khan River.

The project comprises of two phases (phase 1 - study phase; phase 2- implementation phase), with phase 1 successfully completed in 2016 and phase 2 to be executed in 2017.

**Waste management: reduce, reuse and recycle**

Mining operations are resource-intensive, consuming land, water, power, fuel, chemicals and construction materials in order to extract the metal held by the ore body.

During the ore mining and metal-refining processes, waste materials are produced which consist of mineral wastes, in the form of rock and process tailings, and other waste products generated by the services that support the mining process.

Non-mineral waste materials include, for example, waste water, scrap materials, used oils and lubricants from maintenance activities, as well as substantial amounts of packaging materials such as containers and wooden pallets. The aim throughout the various processes is to reduce the generation of waste materials and liquids, reuse these whenever possible and recycle them when reuse is not possible.

The mineral waste generated during operations in 2016 amounted to 25.7 million tonnes, including 9.2 million tonnes of tailings and 16.5 million tonnes of waste rock.

Tailings were deposited on the existing Tailings storage facility, mainly in the re-activated deposition areas that were prepared in 2015. The tailings footprint extended by 4.65 ha, or 0.6 per cent, into a partially disturbed area immediately north of the facility. A plant rescue operation preceded deposition. (See the case study on pages 56-57.)

Rock waste was deposited on the existing rock dumps close to the Open pit with no extension of the footprint. The total mineral waste inventory generated by Rössing Uranium over the past 40 years now consists of 1.36 billion tonnes, covering a total footprint of 1,377 ha, which is about the same size as the town of Swakopmund.

In June 2016, a new waste management contractor was appointed by the mine. The contractor handles recyclable materials such as scrap metal and packaging materials, including containers, paper and wooden pallets.

Waste sorting has been introduced on site, resulting in a shift in distribution of waste streams towards higher volumes of recyclable materials and minimal volumes of various waste materials for disposal.

Waste is sorted by the waste management contractor in Swakopmund and sent to Windhoek for recycling. This has facilitated the closing of our landfill site which had been in operation for 40 years. An oil-recycling company purchases the mine's waste oil for recycling.

Radioactively contaminated wastes are co-disposed on the Tailings storage facility. Other hazardous non-radioactive wastes are disposed of at the hazardous waste facility of the Municipality of Walvis Bay.



### Air-quality management

Air-quality management in mining is a complex task, primarily because dust types are so diverse. Most are diffused and highly variable in nature and therefore difficult to measure. Dust sources are site-specific in terms of silt and moisture content.

Our mining and milling activities release emissions into the air. Dust is generated during blasting, loading and tipping of ore and waste, as well as during crushing and conveying ore.

Winds at speeds above 30 km/h potentially erode fine particles from rock dumps and the Tailings storage facility and disperse them in the environment.

In addition, noise and ground vibrations are created during blasting which is conducted about once a week, while the machinery deployed in the Open pit and the Processing plant generates noise continuously.

### Environmental dust

Dust emissions are of concern to residents of Arandis and Swakopmund, especially when high velocity winds occur in the winter months. Activities such as mining, crushing and driving of heavy vehicles on unpaved roads are the principal producers of dust. In order to quantify volumes of dust, a monitoring network is in place. Appropriate standards are used to assess monitoring results to establish whether dust levels should cause concern.

Two types of dust are measured: firstly, a very fine dust invisible to the naked eye (known as PM<sub>10</sub>) and secondly, fallout dust, which is visible on the ground and can be measured as 'total particulate matter'.

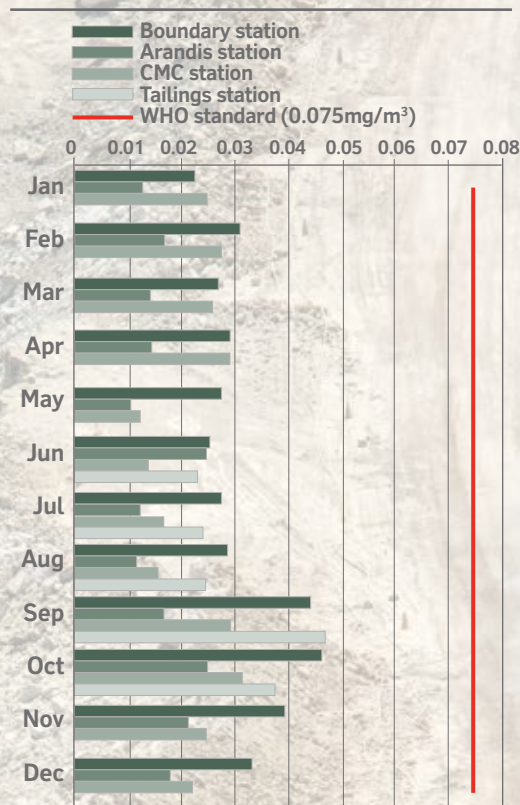
The measure of PM<sub>10</sub> is the weight of particles less than or equal to ten micrometres in diameter in one cubic metre of air. When inhaled, these tiny particles are not filtered out by the body and therefore reach the lungs.

We monitor PM<sub>10</sub> dust levels at four stations continuously. One station is in Arandis, one at the western mine boundary, and two are to the east and west of the Tailings storage facility (see map on the next page, denoted by pink triangles).

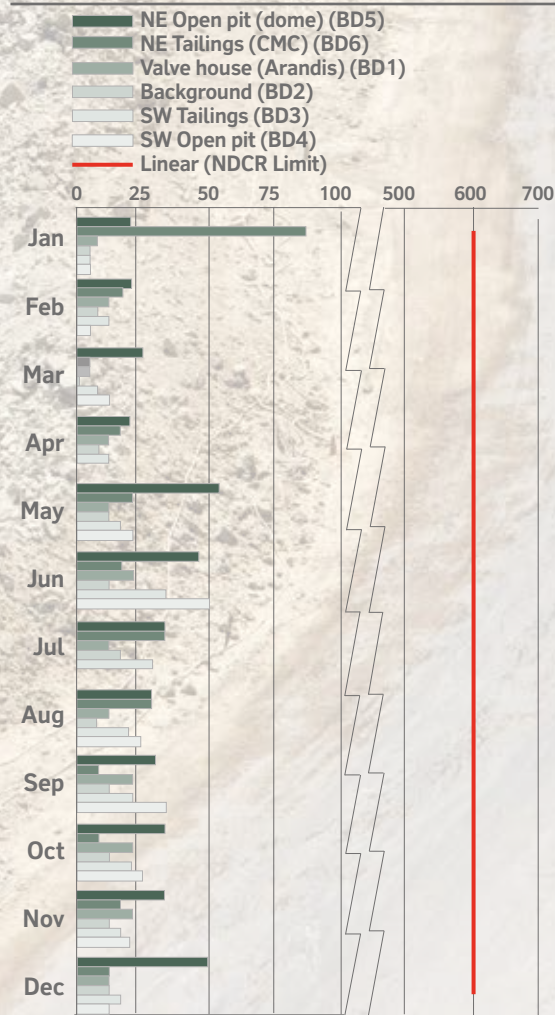
The levels measured in 2016 showed that dust concentrations at all stations were below the adopted World Health Organisation standard of 0.075 mg/m<sup>3</sup>, as indicated in Figure 14 and therefore does not generate concern.

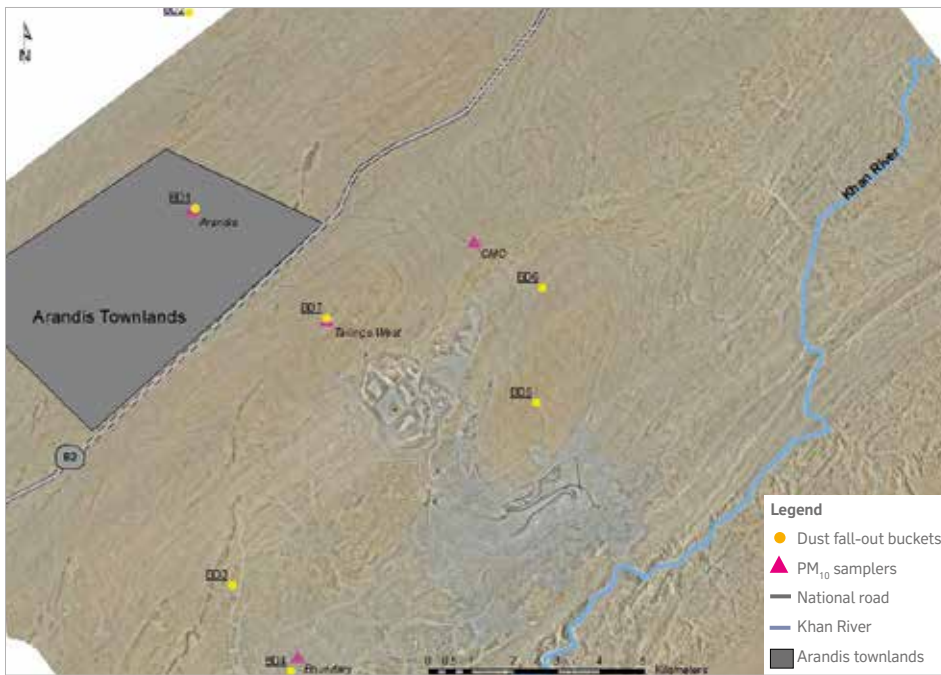
Total dust fall-out is measured as the weight of dust deposited on one square metre of ground in a single day. For this measurement, the residential dust fall-out limit published in South Africa in the National Dust Control Regulations (NDCR) on 1 November 2013 is relevant.

**Figure 14: Monthly average PM<sub>10</sub> dust concentration (mg/m<sup>3</sup>), 2016**



**Figure 15: Monthly average of daily dust deposition rates (mg/m<sup>2</sup>/day) at the mine boundary, Jan-Dec 2016**





(Above) The map indicates the  $PM_{10}$  dust monitoring network samplers and dust fall-out buckets.

The fall-out limit is  $600 \text{ mg/m}^2$  per day with an annual average target of  $300 \text{ mg/m}^2$  per day. Fall-out is measured at six stations throughout the year at different locations along the mine boundary (see the single yellow dots away from the Tailings storage facility on the map above).

Values measured during 2016 at the six stations ranged between  $4$  and  $49 \text{ mg/m}^2$  per day with an annual average of  $18 \text{ mg/m}^2$  per day (see Figure 15) and therefore do not generate concern.

### Energy efficiency and greenhouse gas emissions

Rio Tinto regards efforts to stabilise global atmospheric concentrations of greenhouse gases (GHGs) at low levels a priority. Correspondingly, we measure and manage energy intensity and emissions.

Sources of GHG emissions at Rössing Uranium include electricity and fuel consumption, the transportation of reagents and uranium, blasting explosives, waste management areas (the sewage plant and landfill site), and the extraction and processing of ore. The intensity of emissions is reported per unit of uranium oxide produced.

In 2016, the total energy consumption of the mine was  $1,258,475.98 \text{ GJ}$ . This converts to an annual energy consumption of  $680 \text{ GJ}$  per tonne (GJ/t) of uranium oxide produced, which is above the projection of  $438 \text{ GJ}$  per tonne.

However, this figure represents a lower energy consumption when compared with the rate of the previous year when the consumption was  $714 \text{ GJ/t}$  of uranium oxide produced (see Figure 16).

Emissions of carbon dioxide ( $\text{CO}_2$ ) per unit of production in 2016 amounted to  $81.81$  tonnes of  $\text{CO}_2$  equivalent per tonne ( $\text{CO}_2\text{-e/t}$ ) of uranium oxide, which is below the target of  $90$  tonnes  $\text{CO}_2\text{-e/t}$  of uranium oxide for the year (see Figure 17).

### Closure planning

Current mine plans foresee a cessation of production eight years from now at the end of 2025. Principally, the Open pit will not be backfilled with rock; it will remain a mining void into the future.

By contrast, the Tailings storage facility will be covered with waste rock to prevent dust emissions and rainwater erosion.

Rössing Uranium will continue recovering tailings seepage, but instead of reusing it for mining processes, it will be allowed to evaporate.

The Processing plant and the mine's infrastructure will be demolished. Recyclable materials will be decontaminated before selling them. Materials not leaving site will be disposed of safely and sufficiently covered so that they cannot cause harm.

To achieve these objectives and targets, Rössing Uranium has developed implementation plans for mitigatory measures and calculated the associated closure costs.

The major technical update that had been planned to be conducted in 2016 was not carried out. In lieu of an update, and beginning in 2017, a closure plan at pre-feasibility level, containing more technical detail and higher cost-estimation accuracy, will be developed.

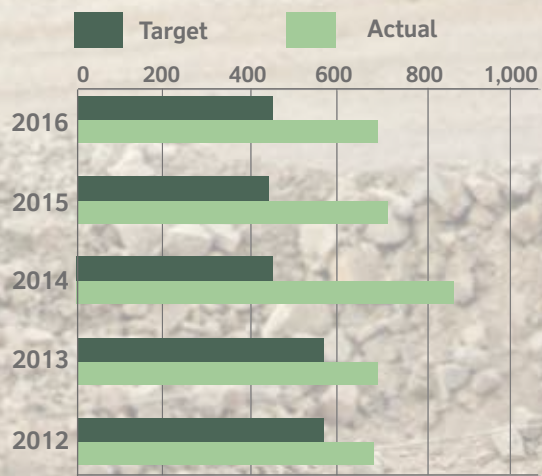
The establishment of the Rössing Environmental Rehabilitation Fund, which provides for expenditures associated with the mine's closure, complies with statutory obligations and stipulated requirements of both the Ministry of Mines and Energy and the Ministry of Environment and Tourism.

Accordingly, the fund agreement states that each year the mining company will make a contribution to the fund to provide for the eventual closure of the mine.

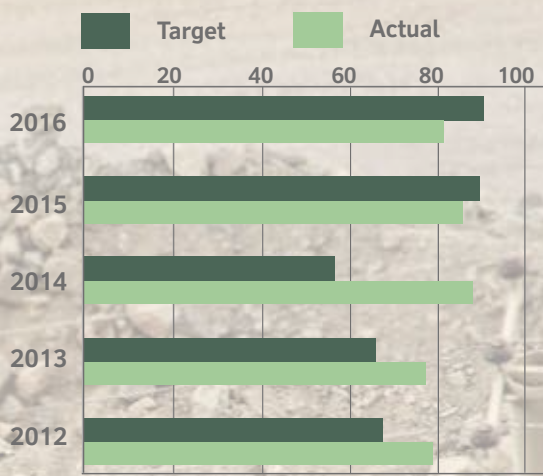
At the end of December 2016, the fund had a cash balance of N\$603 million. In 2016 the total cost of closure, excluding retrenchment costs, was estimated at N\$1.5 billion. The mine will make additional payments to the fund each year to provide for the eventual total cost of closure by 2025.



**Figure 16: Energy consumption**  
(gigajoules per tonne of  $U_3O_8$   
produced), 2012-2016



**Figure 17: Carbon dioxide emissions**  
(tonnes of  $CO_2$  equivalent per tonne of  $U_3O_8$   
produced), 2012-2016





## Case study: Rescuing and restoring several plant species

**Rössing Uranium continues to fulfil its commitment to responsible environmental management by enhancing biodiversity protection. The lifting and replanting of plant species that are in danger of being disturbed due to our mining activities has been ongoing since the early 1970s.**

In the 1970s Rössing Uranium successfully translocated plants that were important from a conservationist standpoint, mainly quiver trees (*Aloe dichotoma*), from the site of the proposed open pit to the National Botanical Garden of Namibia in Windhoek.

In 2013, with assistance from the National Botanical Research Institute, elephant's foot (*Adenia pechuelii*) were also lifted and

replanted around the Communication management centre area outside the mine.

In 2016, we lifted and relocated a number of Euphorbia species; blue-leaved corkwood (*Commiphora glaucescens*); rock corkwood (*Commiphora saxicola*); sandpaper aloe (*Aloe asperifolia*), and a few other gems, including the elephant's foot. These plant species were growing in the vicinity of the area earmarked for the Tailings storage facility extension.

In collaboration with the National Botanical Research Institute, the newly-established Namib Botanical Garden in Swakopmund provided assistance to the mine to lift the plants, and was also a recipient of the rescued plants.

The Ministry of Environment and Tourism has approved the Namib Botanical Garden's role to guide and replant the Namib





flora as most desert plants do not survive well in Windhoek. The group has expert knowledge of lifting, cultivating, propagating, conserving and preserving indigenous Namib floral as stock for future rehabilitation. Beyond providing advisory services, the Namib Botanical Garden's objectives include promoting public awareness, research and education at their garden, which is located in Swakopmund.

Transplanting trials are a worthwhile undertaking which demonstrate Rössing Uranium's commitment to biodiversity protection and conservation. The most recent exercise is a great trial for rehabilitation and restoration purposes.

This commitment is an important factor in obtaining and maintaining access to land and resources, which also demonstrates the exercise of corporate social responsibility to all stakeholders. We are acutely aware how our mining projects and operations impact biodiversity and the ecosystem.

Operational disturbances weaken the natural balance of ecosystems and, in the absence of management,

could compromise their integrity. Operations could pose environmental risk to species if they are carried out in areas designated for their particular conservation value, ie if species are of limited range, are endemic to a specific area or are protected by law.

Rössing Uranium values its reputation as a responsible corporate citizen and conscientiously complies with governmental regulations and requirements regarding the protection of the environment. Our aim is always to minimise our impact on biodiversity. For this reason, any area that is scheduled to undergo ground disturbance, must first go through the approval request process which involves consulting the environmental section at the mine.

*(Photograph) A number of plant species were relocated from the Tailings storage facility (in the middle on the horizon of the photograph) to other areas of the mine site during 2016, demonstrating Rössing Uranium's commitment to biodiversity protection and conservation.*



# Our value addition

## **The motivation to do value-added reporting is linked to the overall process of disclosure regarding financial information.**

By sharing information about the value Rössing Uranium adds through its operations and business activities, the mine aims to bring into focus all aspects of the impact the company makes on the economy of the Erongo Region in which we operate, as well as on the country's economy as a whole.

Our Value-Added Statement (page 61) reflects the wealth created through the sale of our uranium oxide production, payments for services to suppliers, taxes to the Namibian Government, payments to employees and the investments made in neighbouring communities.

## **How Rössing Uranium adds value**

Sustainable development is underpinned by sustainable economies. Our continuing operations are based on our ability to secure access to land, people and capital.

We use our economic, social, environmental and technical expertise to harness these resources and create prosperity for our shareholders, employees and communities, as well as for the Namibian Government and our business partners.

As a major employer and purchaser of goods and services, we make a significant annual contribution to economic development in the Erongo Region in particular and to Namibia at large.

Despite the current financial strain under which we operate, we invested N\$15.4 million in our neighbouring communities during 2016, either directly or through the Rössing Foundation.

The review period also saw us continue to demonstrate our value to Namibia through contributions to the fiscal authorities. Rössing Uranium paid the Government N\$80.4 million in royalty tax, N\$50.8 million in dividends and N\$107.2 million in pay-as-you-earn tax on behalf of employees.

Payments to public enterprises such as NamWater and NamPower amounted to N\$392.7 million, which includes the training levy of N\$5.6 million paid to the

*(Below) As a major employer and purchaser of goods and services, Rössing Uranium makes a significant contribution to economic development and the creation of prosperity for communities. Through such prosperity created, Arandis is seeing houses being built in new developments in the town.*





National Training Authority. We also spent N\$506.7 million in net salaries and wages.

Rössing Uranium gives rise to a significant ‘multiplier effect’ — the phenomenon where spending by one company creates income for and further spending by others. Given the prevailing market conditions, our primary focus was to procure goods and services as cost-effectively and efficiently as possible and to focus on maximising our contribution to the local economy.

In 2016, we spent N\$2.4 billion on goods and services for our operations. As during the previous reporting year, most of the procurement expenditure was on Namibian-registered suppliers, amounting to N\$1.8 billion, accounting for 76.7 per cent of our total procurement expenditure.

We spent 14.0 per cent of our total procurement spend with South African suppliers and 9.3 per cent with international suppliers.

The bulk of the Namibian spend remains in the Erongo Region (46.0 per cent) and Khomas Region (40.4 per cent), while 13.6 per cent were spent in other regions of Namibia.

## Preferential procurement and enterprise development

With the aim of securing economic growth, prosperity and the human dignity of all Namibians, the Government of Namibia developed the Harambee Prosperity Plan and the national, broad-based New Equitable Economic Empowerment Framework (NEEEF).

We remain committed to support Government development initiatives and policy frameworks. As such, we support local suppliers with the main focus on developing small- and medium enterprises, equipping them with the necessary skills and knowledge to compete with international suppliers.

During the reporting period, we purchased N\$90 million worth of goods and services from previously disadvantaged Namibians (SMEs).

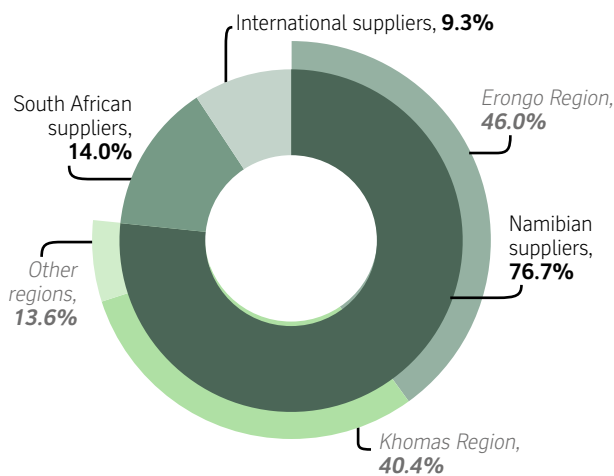


## Summary of Rössing Uranium's value addition

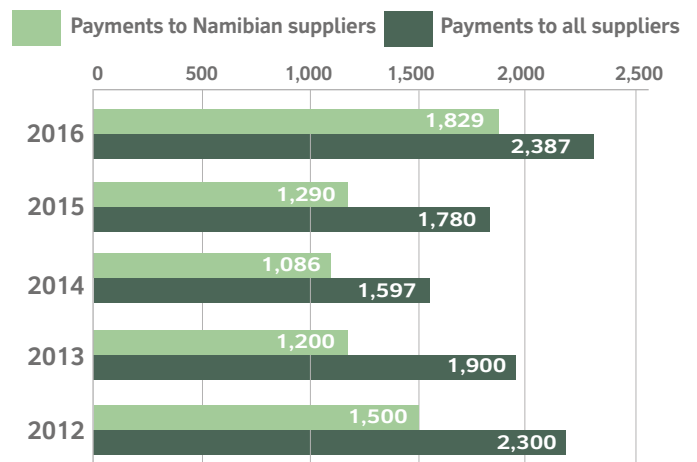
Our business provides a strong base for economic growth in neighbouring communities, in the Erongo Region, and in Namibia as a whole. Our economic contribution comprises the value we add by paying wages, employee benefits and Government taxes and royalties, as well as by making dividend and interest payments, and by retaining capital to invest in the growth of the mine.

In addition, we make significant payments to our suppliers of goods and services, both locally and nationally. The graphs shown below highlight some of the key socioeconomic contributions we have made to Namibia over the past five years, ie from 2012 to 2016.

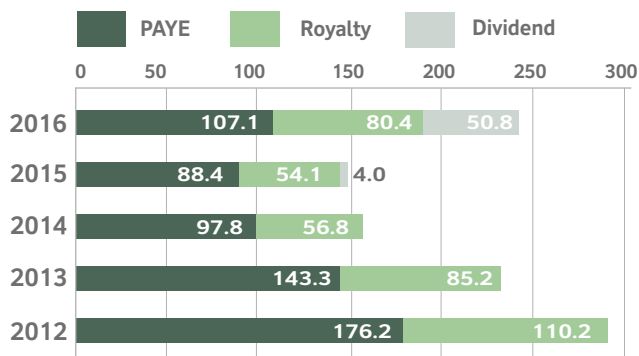
### Distribution of Rössing Uranium's procurement spend, 2016



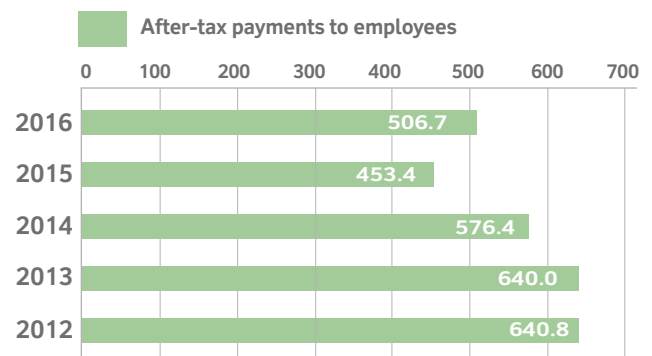
### Payments to suppliers (N\$ million), 2012 to 2016



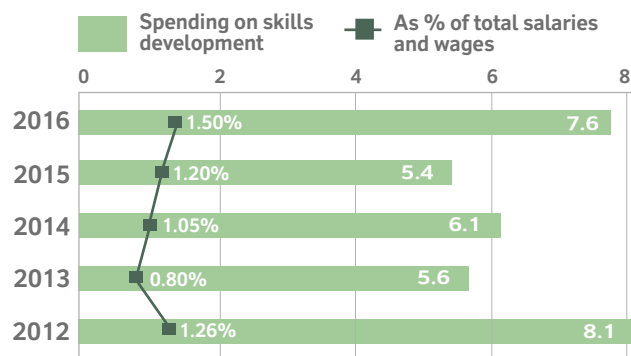
### Contribution to Government revenue (N\$ million), 2012 to 2016



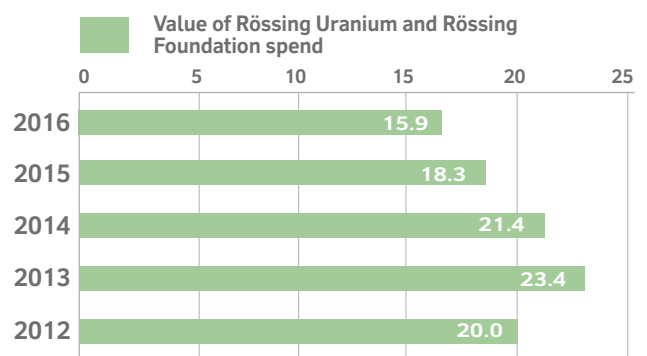
### After-tax payments to employees (N\$ million), 2012 to 2016



### Contribution to skills development (N\$ million), 2012 to 2016



### Contribution to neighbouring communities (N\$ million), 2012 to 2016





Our value addition						
Stakeholders' Value Added Statement <sup>1</sup>	Notes	N\$'000	N\$'000	N\$'000	N\$'000	N\$'000
For the year ended		2016	2015	2014	2013	2012
Turnover		<b>3,070,853</b>	1,841,012	2,405,747	2,969,440	2,880,399
Less: Purchased material and services from non-stakeholders		<b>1,830,175</b>	1,347,984	1,597,397	1,894,295	2,171,879
<b>Total value added</b>		<b>1,240,678</b>	<b>493,028</b>	<b>808,350</b>	<b>1,075,145</b>	<b>708,520</b>
Investment income		<b>46,050</b>	39,361	38,735	22,733	17,098
Release of foreign denominated cash		<b>1,487,750</b>	-	-	-	-
<b>Total wealth created</b>		<b>2,774,478</b>	<b>532,389</b>	<b>847,085</b>	<b>1,097,878</b>	<b>725,618</b>

Employees	1	<b>613,842</b>	541,761	674,138	783,332	817,032
Providers of equity capital		<b>1,436,906</b>	111,798	-	-	-
Providers of loan capital		-	-	-	-	-
Government	2	<b>523,900</b>	371,891	414,288	394,774	385,224
The Rössing Foundation		<b>12,000</b>	12,000	1,394	-	-
Reinvested in the Group	3	<b>187,830</b>	(505,061)	(242,735)	(80,228)	(476,638)
<b>Total wealth distributed</b>		<b>2,774,478</b>	<b>532,389</b>	<b>847,085</b>	<b>1,097,878</b>	<b>725,618</b>

<sup>1</sup> Stakeholders in this context: Shareholders, Government, lenders, employees and the Rössing Foundation

Notes to the Stakeholders' Value Added Statement (N\$'000)						
<b>1. Employees</b>		<b>613,842</b>	541,761	674,138	783,332	817,032
- Net salaries and wages		<b>506,684</b>	453,379	576,379	640,039	640,842
- Pay-as-you-earn (PAYE) taxes		<b>107,158</b>	88,382	97,759	143,293	176,190
<b>2. Government</b>		<b>523,900</b>	371,891	414,288	394,774	385,224
- Dividend		<b>50,844</b>	3,956	-	-	-
- Erongo Regional Electricity Distributor		<b>2,008</b>	2,372	2,584	2,599	2,630
- Mining royalty tax		<b>80,352</b>	54,132	56,828	85,240	110,183
- NamWater		<b>128,680</b>	101,129	142,392	59,716	39,488
- NamPost		-	-	-	-	25
- NamPort		<b>2,740</b>	2,271	2,064	1,658	1,897
- NamPower		<b>232,043</b>	178,852	183,188	214,639	189,428
- Rates, taxes and licences		<b>1,388</b>	3,239	2,492	1,948	2,408
- National Training Authority		<b>5,594</b>	5,013	4,756	-	-
- Receiver of Revenue		-	-	-	-	-
Current tax		-	-	-	-	-
- Road Fund Administration		<b>1,383</b>	1,349	1,229	1,084	1,123
- Telecom Namibia		<b>4,375</b>	2,683	3,843	4,671	5,777
- TransNamib		<b>14,493</b>	16,895	14,912	23,219	32,265
<b>3. Reinvested in the Group</b>		<b>187,830</b>	(505,061)	(242,735)	(80,228)	(476,638)
- Depreciation		<b>333,697</b>	279,842	262,876	228,627	243,860
- Retained earnings		<b>107,099</b>	(384,780)	(90,877)	31,586	(193,887)
- Deferred stripping capitalised		<b>(282,538)</b>	(227,591)	(340,564)	(355,305)	(455,603)
- Deferred tax		<b>29,572</b>	(172,532)	(74,170)	14,864	(71,008)

# Corporate governance at Rössing Uranium

**In line with its corporate values, Rössing Uranium is committed to the responsible stewardship of natural resources. We aim to be a leader in environmental stewardship and to maintain our reputation as a responsible corporate citizen. This aim can only be realised if we understand and appreciate the natural resources which are located in the areas in which we operate and if we use them in a manner that minimises the mine's impact even after mining operations have been terminated.**

## Rio Tinto Integrity and compliance programme

Rössing Uranium has adopted the Rio Tinto Integrity and compliance programme as set out in *The way we work*, which symbolises what we stand for as a business. It makes clear how we behave according to our values of safety, teamwork, respect, integrity, and excellence. *The way we work* applies to all employees as well as consultants, agents, contractors and suppliers.

## The board of directors

The board of directors executes a mandate received from the shareholders. This mandate ensures that Rössing Uranium operates as a world-class, responsible company which has assembled an executive team to achieve specific targets.

The board runs the company in accordance with the mandate outlined in Rössing Uranium's Articles of Association, ensuring that stakeholder interests are balanced and receive due attention.

Rössing Uranium has a unitary board. Roles of the chairperson and managing director are separated and distinct, and the number and stature of directors serving on the board ensure that sufficient member independence stands behind the decision-making process. The board is comprised of members who possess a wide spectrum of skills, knowledge, independence, experience and diversity, which will best serve the interests of the company and its stakeholders.

The board held four meetings during the year under review, 2016. The members are listed in the table on the following page.

## Functions of the board

A board charter governs the functions of the board of directors, while the Nomination and Remuneration Committee monitors the board's performance.

The board adopts corporate strategy, plans of action, major policies and monitors operational performance. Its duties include identifying risks to the company's sustainability, monitoring risk management and internal controls. It also oversees compliance management, corporate governance, business plans and key performance indicators, which include non-financial criteria and annual budgets.

The board is also responsible for maintaining favourable and productive relationships with stakeholders. All directors bear full fiduciary responsibility and are obliged to exercise care in all company matters commensurate with their ability and skills. The board meets quarterly and otherwise when circumstances require.

## Board Audit and Risk Committee

The Board Audit and Risk Committee was established as a sub-committee of the board of directors and acts in accordance with an approved mandate under terms of reference and assists the board to fulfil its oversight responsibilities relating to:

- the safeguarding of assets;
- the operation of adequate systems and control processes;
- the preparation of accurate financial reports and statements in compliance with all applicable legal requirements and accounting standards;



Board of directors as at 31 December 2016	Role
J Gawaxab	Chairperson, independent non-executive director
W Duvenhage	Managing director (executive director)
A S I Angula	Independent non-executive director
F L Namene	Independent non-executive director
S C Trott	Rio Tinto plc shareholder representative; non-executive director
T J Wilcox (alternate to S C Trott)	Rio Tinto plc shareholder representative; non-executive director
F Fredericks	Independent non-executive director
H P Louw	Independent non-executive director
E I Shivolo	Government of the Republic of Namibia's shareholder representative; non-executive director
C W H Nghaamwa (alternate to E I Shivolo)	Government of the Republic of Namibia's shareholder representative; non-executive director
M L Mothoa	Rio Tinto plc shareholder representative; non-executive director
D S Kunji-Behari (alternate to M L Mothoa)	Rio Tinto plc shareholder representative; non-executive director

- the preparation of accurate and reliable operational reports and statements, which are in compliance with all applicable legal requirements and operational standards;
- Rössing Uranium's compliance with all the relevant laws and regulations;
- Rössing Uranium's compliance with established policies and procedures; and
- the effective implementation and compliance with the Rössing Uranium's risk management process.

In performance of its duties, the Board Audit and Risk Committee maintains effective working relationships with the board of directors, management, internal and external auditors and other assurance providers, and is entitled to refer to the findings of experts, which shall include internal and external auditors.

## Nomination and Remuneration Committee

The Nomination and Remuneration Committee is appointed by the board of directors to assist in fulfilling its responsibility to the company's shareholders regarding the selection, nomination, performance, remuneration and succession of directors.

The Nomination and Remuneration Committee determines a remuneration structure for the board of directors and members of the sub-committees.

The remuneration rates are subjected to an annual review in February and any increases are submitted to the board of directors for presentation to the annual general meeting for shareholder approval.

The primary duties of the Nomination and Remuneration Committee are to:

- identify qualified individuals as potential members of the board of directors;
- make recommendations to the board relating to the nomination and selection of directors;
- review the results of performance assessments of board members;
- ensure that appropriate procedures are used to assess the remuneration of the chairperson, vice chairperson, executive and non-executive directors, board committees and the board as a whole;
- review the policy for executive remuneration and for the remuneration and benefits of individual executive directors;
- review plans for the succession for board members; and
- review reporting disclosures related to Nomination and Remuneration Committee activities to ensure these disclosures meet the board's disclosure objectives and all relevant compliance requirements.

Functions of the Committee will remain flexible so that it can react to changing conditions effectively and assure the board of directors and shareholders that the company can attract, remunerate and retain directors of the highest calibre.

## Special-purpose vehicles

The company has established two special-purpose vehicles, namely the Rössing Foundation and the Rössing Environmental Rehabilitation Fund, which are managed independently of Rössing Uranium by their own trustees. Members of Rössing Uranium's board are among these trustees.

Rössing Uranium established the Rössing Foundation in 1978 through a Deed of Trust to implement and facilitate its corporate social responsibility activities in communities of Namibia.

The trustees of the Rössing Environmental Rehabilitation Fund review the closure plans and trust funds to make provision for eventual closure and rehabilitation of the mine site.

## The Corporate Governance Code for Namibia (NamCode)

Effective 1 January 2014, Rössing Uranium adopted the NamCode which is based on international best practices and the King Code of Governance for South Africa, 2009. The mine's corporate governance sometime deviates from the NamCode. These deviations are listed in the table below.

## Financial statements

The directors are responsible for monitoring and approving the financial statements to ensure that they fairly represent the company's affairs and its profits or losses at the end of each financial year. Independent auditors are responsible for expressing an opinion on the fairness with which these financial statements represent the company's financial position.

Deviations from the NamCode	
NamCode 16.1: The chairman should be appointed by the board every year after carefully monitoring his independence and factors that may impair his independence.	Rössing Uranium Articles of Association Art. 82: The chairman is elected for a period determined by the directors. If no period is designated, the chairman shall hold office until otherwise determined by the directors.
NamCode 16.10: There should be a succession plan for the position of the chairman.	Nomination and Remuneration Committee: The appointment of deputy chairman was postponed in 2016 and will be revisited in 2017.
NamCode 18.12: As a minimum two executive directors should be appointed to the board, being the chief executive officer (CEO) and a director responsible for the finance function (CFO). This will ensure that there is more than one point of contact between the board and management.	In line with a board decision to reduce its size, the chief financial officer is available at all meetings to answer questions and make presentations to the board.
NamCode 18.17: (see 18.16) Independent non-executive directors may serve longer than nine years if, after an independence assessment by the board, there are no relationships or circumstances likely to affect, or appearing to affect, the director's judgement. A statement to this effect should be included in the integrated report.	Rössing Uranium board charter: The length of service which a non-executive director may serve is limited to three terms of three years each and a retirement age of 70 is prescribed with the directors' discretion to overrule if deemed fit.
NamCode 26: Companies should disclose the remuneration of each individual director and certain senior executives.	The remuneration of directors and senior management is disclosed to shareholders. Rössing Uranium does not propose to disclose this information to the public.
NamCode 27: Shareholders should approve the company's remuneration policy.	Remuneration is reviewed in detail by the Nomination and Remuneration Committee and approved in principle by shareholders.



Rössing Uranium's management prepares the financial statements in accordance with the International Financial Reporting Standards and in a manner which the Namibian Companies Act (Namibian Companies Act (28) of 2004, amended 2011) requires.

Independent auditors found the company's statements on appropriate accounting policies, applied consistently and supported by reasonable and prudent judgements and estimates.

### **Independence of external auditors**

The independent auditors PricewaterhouseCoopers audited the Group's annual financial statements. The company believes that the auditors have observed the highest professional ethics and has no reason to suspect that the firm has not acted independently of the company. The Board Audit and Risk Committee has confirmed the independence of the external auditors for the reporting period.

### **Company secretary**

The company secretary, G D Labuschagne, is suitably qualified and has access to the company's resources to effectively execute her duties. She provides support and guidance to the board in matters relating to governance and compliance practices across the company.

All directors have unrestricted access to the company secretary.

### **Risk report**

Risk management is a fundamental feature of the company's business activities. The company keeps risk management at the centre of its activities and cultivates a culture in which risk management is embedded in the daily management of the business.

The board acknowledges its overall responsibility in the process of risk management as well as responsibility to review its effectiveness.

Executive management is accountable to the board for designing, implementing and monitoring the process of risk management, as well as for integrating it with the company's day-to-day activities. To this end, the company has fully adopted and implemented the Rio Tinto Group risk policy and methodology.

### **Internal audit**

The company's internal audit function performs an independent-appraisal activity with the full cooperation of the board and management.

It has authority to independently determine the scope and extent of the business activity which is to be performed. Its objective is to assist executive management with the effective discharge of its responsibilities by examining and evaluating the company's activities, resultant business risks and systems of internal control.

The mandate of the internal audit function requires it to bring any significant control weaknesses to the attention of management and the Board Audit and Risk Committee for remedial action.

The internal audit function is outsourced to KPMG. The internal audit reports functionally to the company's Board Audit and Risk Committee and administratively to the company secretary.

### **Internal control**

Internal control comprises methods and procedures that management has implemented to ensure:

- compliance with policies, procedures, laws and regulations;
- authorisation, by implementing the appropriate review and approval procedures;
- reliability and accuracy of data and information (decision-making at Rössing Uranium needs to be grounded on accurate, timely, useful, reliable and relevant information);
- effectiveness and efficiency, which all operations at Rössing Uranium need to embody, using resources economically, while adding value to the economy. Rössing Uranium achieves this objective by continuously monitoring its goals and by embodying the credo, 'that which is measured is controlled'; and
- safeguarding of assets, which need to be protected from theft, misuse or use for fraudulent or destructive purposes.

The directors are responsible for maintaining an adequate system of internal control. It is understood that such a system reduces, but cannot entirely eliminate, the possibility of fraud or error.

# Summary annual financial statements

## SUMMARY STATEMENT OF FINANCIAL POSITION AS AT 31 DECEMBER 2016

	Notes	Audited 2016 N\$'000	Audited 2015 N\$'000
<b>ASSETS</b>			
<b>Non-current assets</b>			
Property, plant and equipment	5	3,463,209	3,310,150
Defined benefit pension asset		85,196	57,801
Rössing Environmental Rehabilitation Fund asset		603,482	504,702
<b>Current assets</b>			
Inventories	7	560,360	616,090
Trade and other receivables		305,285	252,454
Rio Tinto Finance Ltd receivable		1,447,534	3,198,205
Cash and cash equivalents		57,642	239,270
Restricted cash		264,188	74,517
Assets held for sale	6	-	4,496
<b>Total assets</b>		<b>6,786,896</b>	<b>8,257,685</b>
<b>EQUITY AND LIABILITIES</b>			
<b>Equity</b>			
Share capital		223,020	223,020
Retained earnings		4,255,879	5,837,949
<b>Non-current liabilities</b>			
Interest-bearing borrowings	8	9,832	10,784
Deferred tax liabilities		145,033	115,461
Provision for closure and restoration costs		1,170,437	1,064,949
Post-employment obligation		15,312	13,419
<b>Current liabilities</b>			
Bank overdraft		34,385	830
Trade and other payables		931,885	990,248
Current portion of interest-bearing borrowings	8	1,113	1,025
<b>Total equity and liabilities</b>		<b>6,786,896</b>	<b>8,257,685</b>

## SUMMARY STATEMENT OF CHANGES IN EQUITY FOR THE YEAR ENDED 31 DECEMBER 2016

	Share capital N\$'000	Retained Earnings N\$'000	Total N\$'000
<b>Balance at 1 January 2016</b>	223,020	5,837,949	6,060,969
Total comprehensive income and expenses	-	(94,320)	(94,320)
Dividends paid	-	(1,487,750)	(1,487,750)
<b>Balance at 31 December 2016</b>	<b>223,020</b>	<b>4,255,879</b>	<b>4,478,899</b>
<b>Balance at 1 January 2015</b>	223,020	5,506,152	5,729,172
Total comprehensive income and expenses	-	447,551	447,551
Dividends paid	-	(115,754)	(115,754)
<b>Balance at 31 December 2015</b>	<b>223,020</b>	<b>5,837,949</b>	<b>6,060,969</b>



## Summary annual financial statements (continued)

### SUMMARY STATEMENT OF COMPREHENSIVE INCOME AND EXPENSES FOR THE YEAR ENDED 31 DECEMBER 2016

	Notes	Audited 2016 N\$'000	Audited 2015 N\$'000
<b>Continuing operations</b>			
Revenue		3,070,853	1,841,012
Other income		203,588	223,087
		<b>3,274,441</b>	2,064,099
Operating costs		(2,761,970)	(2,320,576)
Depreciation, amortisation and impairment charges		(333,697)	(279,842)
Other net (loss) / gains		(189,267)	886,756
Royalties-mining		(80,353)	(54,132)
<b>Operating (loss) / profit</b>		<b>(90,846)</b>	296,305
Finance income		46,050	39,361
Finance costs		(76,257)	(69,282)
<b>(Loss) / Profit before income tax</b>		<b>(121,053)</b>	266,384
Income tax	4	(29,572)	172,532
<b>Other comprehensive (loss) / income for the year</b>		<b>56,305</b>	8,635
Actuarial gains on defined benefit pension asset			
<b>Total comprehensive (loss) / income for the year attributable to equity holders of company</b>		<b>(94,320)</b>	447,551
<b>Reconciliation of total comprehensive income for the year to net profit/(loss) after tax from normal operations</b>			
<b>Total comprehensive income for the year as above</b>		<b>(94,320)</b>	447,551
- Actuarial gains on defined benefit asset		(56,305)	(8,635)
- Forex loss / (gain) on Kalahari and Extract funds		257,724	(823,696)
<b>Net profit/(loss) after tax from normal operations</b>		<b>107,099</b>	(384,780)

### SUMMARY STATEMENT OF CASH FLOWS FOR THE YEAR ENDED 31 DECEMBER 2016

	Notes	Audited 2016 N\$'000	Audited 2015 N\$'000
<b>Cash flows from operating activities</b>			
Cash generated / (utilised) by operations		39,559	(276,423)
Interest received		46,050	39,361
Interest paid		(7,035)	(4,605)
<b>Net cash generated / (utilised) by operating activities</b>		<b>78,574</b>	(241,667)
<b>Cash flows from investing activities</b>			
Purchases of property, plant and equipment	5	(169,302)	(207,420)
Decrease in investment in Rio Tinto Finance Ltd.		1,492,947	-
Proceeds from sale of fixed assets		45,584	54,002
Contributions made to Rössing Environmental Rehabilitation Fund		(61,287)	(60,000)
<b>Net cash received from / (utilised) by investing activities</b>		<b>1,307,942</b>	(213,418)
<b>Cash flows from financing activities</b>			
Dividends paid		(1,487,750)	(115,754)
Decrease in interest-bearing borrowings		(864)	(930)
<b>Net cash utilised by financing activities</b>		<b>(1,488,614)</b>	(116,684)
<b>(Decrease)/Increase in cash and cash equivalents</b>		<b>(102,098)</b>	(571,769)
Cash and cash equivalents at beginning of year		312,957	832,602
Effects of exchange rate changes on cash and cash equivalents		76,586	52,124
<b>Cash and cash equivalents at end of year</b>		<b>287,445</b>	<b>312,957</b>

*Summary annual financial statements (continued)***NOTES TO THE SUMMARY ANNUAL FINANCIAL STATEMENTS FOR THE YEAR ENDED 31 DECEMBER 2016****1. Reporting Entity**

Rössing Uranium Limited is a company domiciled in the Republic of Namibia. These are the summary annual financial statements of the company as at and for the year ended 31 December 2016. The audited annual financial statements of the company as at and for the year ended 31 December 2016 are available upon request from the company's registered office.

**2. Statement of compliance**

These summary annual financial statements have been prepared in accordance with the framework concepts and the measurement and recognition requirements of IFRS and disclosure requirements of IAS 34, Interim Financial Reporting and the requirements of the Namibian Companies Act. They do not include all of the information required for full annual financial statements, and should be read in conjunction with the annual financial statements of the company as at and for the year ended 31 December 2016.

**3. Significant accounting policies**

The accounting policies applied by the company in these summary annual financial statements are the same as those applied by the company in its annual financial statements as at and for the year ended 31 December 2016. The accounting policies and methods of computation applied in the preparation of the summary consolidated financial report are consistent with those applied for the period ended 31 December 2015.

	<b>2016</b>	2015
	<b>N\$'000</b>	N\$'000
<b>4. Taxation</b>		
Namibia - current taxation	-	-
Namibia - deferred taxation	<b>29,572</b>	(172,532)
	<b>29,572</b>	(172,532)

**5. Property, plant and equipment**

Net book value at beginning of the year	<b>3,310,150</b>	3,169,492
Additions	<b>169,302</b>	207,420
Deferred stripping capitalised	<b>282,538</b>	227,591
Disposals	<b>(1,350)</b>	(702)
Depreciation and impairment	<b>(333,697)</b>	(279,842)
Increase / (decrease) in closure provision	<b>36,266</b>	(13,809)
Net book value at end of the year	<b>3,463,209</b>	3,310,150

**6. Assets held for sale**

Net book value at beginning of the year	<b>4,496</b>	4,496
Disposals	<b>(4,496)</b>	-
Net book value at end of the year	<b>-</b>	4,496

During 2013 the company decided to develop and service a block of residential erven situated in Ocean View, Swakopmund, with the intention to sell the properties in the open market. After completion of the civil works to service the erven, all plots were made available for sale to the public. All erven have now been sold.

No material liabilities associated with the assets held for sale existed at the financial year-end.



*Summary annual financial statements (continued)***NOTES TO THE SUMMARY ANNUAL FINANCIAL STATEMENTS FOR THE YEAR ENDED 31 DECEMBER 2016 (CONTINUED)**

	<b>2016</b>	2015
	<b>N\$'000</b>	N\$'000
<b>7. Inventory</b>		
Inventory is stated after		
- Providing for obsolescence		
- raw materials	<b>22,316</b>	28,742
<b>8. Interest-bearing borrowings</b>		
<b>Non-current liabilities</b>		
Capitalised finance lease agreements	<b>9,832</b>	10,784
<b>Current liabilities</b>		
Capitalised finance lease agreements	<b>1,113</b>	1,025
	<b>10,945</b>	11,809
<b>9. Capital commitments</b>		
Capital expenditure contracted but not yet incurred as at 31 December 2016	<b>70,433</b>	41,908

**10. Unconditional purchase obligations**

The company has entered into minimum off-take agreements with the suppliers of sulphuric acid for the next four years. The total undiscounted amount at the year-end amounted to N\$997,167,921 (2015: N\$1,348,748,728). The company also entered into a new desalinated water off-take agreement with NamWater, which includes the commitment to off-take certain quantities of water for the next 10 months. The total undiscounted amount at the year-end amounted to N\$53,926,288 (2015: N\$143,444,000).

**11. Guarantees**

During the year the company entered into a new desalinated water off-take agreement with NamWater. The agreement includes the provision of a bank guarantee of N\$14,736,218 (2015: N\$12,975,138). The updated off-take agreement is valid until 25 October 2017.

**12. Related parties**

The company is controlled by Skeleton Coast Diamonds Limited which owns 68,6% of the company's issued shares. The remaining 31,4% of the shares are widely held. The ultimate holding company is Rio Tinto plc, a company registered in the United Kingdom.

**Summary of related party transactions**

Sales to Related Parties	<b>2,922,659</b>	1,716,934
Purchase of Product and Services	<b>322,235</b>	392,730
Receivables from Related Parties	<b>1,553,889</b>	3,205,806
Payables to Related Parties	<b>66,881</b>	215,501

**13. Fair Value of Financial Instruments**

At 31 December 2016, the carrying amounts of cash and short-term deposits, trade accounts receivable, trade accounts payable, accrued expenses and current interest-bearing borrowings approximated fair values due to the short-term maturities of these assets and liabilities. The carrying value of non-current interest-bearing borrowings approximates fair value due to the fact that the underlying interest rate is linked to the prevailing market interest rates. All financial instruments are categorised as level 3. Settlement costs are expected to be immaterial.

## Summary annual financial statements (continued)

### NOTES TO THE SUMMARY ANNUAL FINANCIAL STATEMENTS FOR THE YEAR ENDED 31 DECEMBER 2016 (CONTINUED)

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#### COMPANY OPERATIONAL AND FINANCIAL REVIEW

##### Financial performance

Revenue increased by 67% compared to the previous year due to higher sales volumes as result of the return to continued operations late in 2015. This had a positive impact and lead to a net profit after tax of N\$107 million (2015: net loss after tax of N\$385 million) from normal operations. Further details of the company's financial performance are set out in the summary statement of comprehensive income.

##### Operations

Production of uranium oxide for the year was 1,850 metric tonnes compared to 1,245 metric tonnes in 2015. A total of 24,428,455 metric tonnes (2015: 19,271,341 metric tonnes) were mined from the Open pit and 9,194,439 metric tonnes (2015: 6,875,719 metric tonnes) of ore were milled. The mine is currently operating on an approved Life-of-mine plan to 2025 (2015: 2025). There are existing mineral resources, which could expand mining beyond this period into the next decade.

##### Dividends

A first dividend of 547.0 cents per share was approved on the 2<sup>nd</sup> of March 2016 to the value of N\$905,832,000 and paid out in March 2016. A second dividend of 351.4 cents per share was approved on the 17<sup>th</sup> of August 2016 to the value of N\$581,918,400 and paid out during September 2016. The total dividend declared and paid in 2016 amounted to N\$1,487,750,400 (2015: N\$115,754,400).

##### Subsequent events

There were no subsequent events to report as at date of issue of the audited financial statements.

##### Auditors opinion

The summary results for the year ended 31 December 2016 have been audited by PricewaterhouseCoopers. The auditor's unqualified opinion is available for inspection at the company's registered office.

##### Directors

J Gawaxab (Chairman), W Duvenhage\* (Managing), A S I Angula, S C Trott\*\* (alternate T J Wilcox\*\*\*), F Fredericks, M L Mothoa\* (alternate D S Kunji-Behari\*), E I Shivolo (alternate C W H Nghaamwa), F L Namene, H P Louw\*.

\*South African \*\*Australian \*\*\* British

##### Company Secretary

G D Labuschagne  
P O Box 22391  
Windhoek

##### Auditors

PricewaterhouseCoopers  
P O Box 12  
Walvis Bay



## Assurance

Our vision is to carry out our business with integrity, honesty and fairness at all times. We build from a foundation of compliance with relevant laws, regulations and international standards, and are in line with various Rio Tinto and Rössing Uranium guidelines on leading business practices, such as *The way we work*, Rio Tinto's global code of business conduct.

Much of our work is subjected to various external assurance and verification processes throughout the year. For example, external auditors audit our financial statements, while an external environmental auditing company audits our environmental figures each year. The following auditing companies, Government bodies and other institutions reviewed the company's practices in 2016:

- PricewaterhouseCoopers (Rio Tinto Corporate Annual Report data assurance, designed to provide limited assurance over selected items; in Rössing Uranium's case, AIFR data, closure costing and water usage);
- KPMG (internal audits);
- Rio Tinto Corporate Assurance (internal audits);
- Bureau Veritas (ISO 14001:2004 certification and Rio Tinto HSEQ management system business conformance);
- International Atomic Energy Agency (industry control);
- SLR Environmental Consulting, SRK Consulting and Aqua Terra Consulting (review of tailings and associated environmental aspects every second year);
- AECOM and SLR Environmental Consulting (third party review of Tailings storage facility stability and design);
- Environmental Resources Management Limited (Rio Tinto operations and business unit assessment - safety culture diagnostics and critical risk and control improvements);
- Ministry of Labour and Social Welfare: Affirmative Action (Employment) Act, 1998 (No. 29 of 1998) (compliance verification in respect of labour-related Acts);
- Ministry of Health and Social Services (compliance verification in respect of health and related Acts);
- Ministry of Agriculture, Water and Forestry (compliance verification in respect of effluent management and water-related Acts);
- Ministry of Mines and Energy (compliance verification in respect of mining operation-related Acts); and
- Ministry of Finance (compliance verification in respect of income tax and finance-related Acts).

## List of references

*The way we work*: Rio Tinto's global code of business conduct

*Rio Tinto Procurement principles*

*Business integrity standard*

*Antitrust standard*

*Data privacy standard*

*Employment policy*

*Inclusion diversity policy*

*HSEC policy*

*Communities and social performance standard*

*Governance policy*

*Human rights policy*

*Risk management policy*

*Treasury policy*

*Tax policy*

These reference documents are all available electronically at [www.riotinto.com](http://www.riotinto.com), or in hard copy by writing to Rio Tinto, 6 St James's Square, London, SW1Y 4AD, United Kingdom, Tel. +44 20 7781 2000.

# Performance data table

	2016	2015	2014	2013	2012
<b>Employees</b>					
Number of employees	949	948	850	1,141	1,528
<b>Production</b>					
Uranium oxide produced (tonnes)	1,850	1,245	1,543	2,409	2,699
Ore milled ('000 tonnes)	9,194	6,876	7,040	10,076	12,127
Waste rock removed ('000 tonnes)	16,467	12,471	16,225	24,448	31,737
Ratio of ore milled to waste rock removed	0.56	0.55	0.43	0.41	0.38
<b>Health, safety and environment</b>					
New cases of pneumoconiosis	0	0	0	0	0
New cases of dermatitis	0	0	1	2	3
New cases of hearing loss	0	0	1	0	0
New cases of chronic bronchitis	0	0	0	0	0
All-injury frequency rate (AIFR)	0.82	0.74	0.81	0.96	0.49
Number of lost-day injuries	5	7	8	13	4
Source dust levels at Fine crushing plant (mg/m <sup>3</sup> )	1.81	1.25	2.03	2.95	2.35
Freshwater consumption ('000 m <sup>3</sup> )	2,654	2,103	2,436	2,914	3,103
Freshwater usage per tonne of ore milled (m <sup>3</sup> /t)	0.29	0.30	0.35	0.29	0.26
Ratio of fresh water:total water	0.38	0.36	0.43	0.41	0.38
Seepage water collected ('000 m <sup>3</sup> )	2,407	2,206	1,848	2,060	2,387
Energy use on site (GJ x 1,000)	2,528	1,777	1,108	1,007	1,852
Energy use per tonne of ore milled (MJ/t)	137.03	129.25	148.88	174.79	153.03
CO <sub>2</sub> total emission (kt CO <sub>2</sub> equivalent)	150.06	106.87	118.31	187.82	211.6
CO <sub>2</sub> equivalent emission per tonne of production (e/t uranium oxide)	81.81	85.87	82.00	78.04	78.41
<b>Product and customers</b>					
Uranium spot market price (US\$/lb) (average)	25.64	36.55	33.17	38.17	48.70



# Rössing Uranium's production of uranium oxide and the nuclear fuel cycle

Uranium is a relatively-common element that is found in the earth all over the world, mined in many countries and processed into yellow cake, ie uranium oxide (U<sub>3</sub>O<sub>8</sub>). Uranium oxide has to be processed before it can be used as a fuel for a nuclear reactor, that is, where electricity is generated to produce heat and steam in order to drive a turbine connected to a generator.

Rössing Uranium's operations



**1. Drilling and blasting**  
Through drilling, blasting, loading and hauling, the uranium ore at Rössing Uranium is mined. Due to the erratic distribution of minerals in the ground, waste and ore are often mixed. Radiometric scanners measure the radioactivity level of each truckload, determining whether the material is sent to the primary crushers or to the low-grade stockpile. Waste is transported to a separate storage area.



**2. Crushing**  
Ore is delivered to the Primary crushers by haul trucks and then by conveyor to the coarse ore stockpile. It passes through a further series of crushers and screens until the particles are smaller than 19 mm. After weighing, the fine ore is stored on another stockpile.



**3. Grinding**  
Wet grinding of the crushed ore by means of steel rods reduces it further to slurry with the consistency of mud. The four rod mills, which are 4.3 m in diameter, are utilised as required by production levels and operate in parallel.



**4. Leaching**  
A combined leaching and oxidation process takes place in large mechanically agitated tanks. The uranium content of the pulped ore is oxidised by ferric sulphate and dissolved in a sulphuric acid solution.



**5. Slime separation**  
The product of leaching is a pulp containing suspended sand and slime. Cyclones separate these components and, after washing in roto scoops to remove traces of uranium-bearing solution, the sand is transported via a sand conveyor to a tailings storage facility.



**6. Thickening**  
Counter current decantation thickeners wash the slimes from previous stages. A clear uranium-bearing solution ('pregnant' solution) overflows from the thickeners, while the washed slime is mixed with the sands and pumped to the tailings area.



**7. Continuous ion exchange**  
The clear 'pregnant' solution now comes into contact with beads of specially formulated resin. Uranium ions are adsorbed onto the resin and are preferentially extracted from the solution. Beads are removed periodically to elution columns. There the acid wash removes the uranium from the beads. The resulting eluate is a purified and more concentrated uranium solution.



**8. Solvent extraction**  
The acidic eluate from the ion exchange plant is mixed with an organic solvent which takes up the uranium-bearing component. In a second stage, the organic solution is mixed with a neutral aqueous ammonium sulphate solution which takes up the uranium-rich 'OK liquor'. The acidic 'barren aqueous' solution is returned to the elution columns.



**9. Precipitation**  
The addition of gaseous ammonia to the 'OK liquor' raises the solution pH, resulting in precipitation of ammonium diuranate, which is then thickened to a yellow slurry.



**10. Filtration**  
The ammonium diuranate is recovered on rotating drum filters as 'yellow paste, known as 'yellow cake'.



**11. Drying and roasting**  
Final roasting drives off the ammonia, leaving uranium oxide. The final product is then deposited in metal drums. Neither ammonium diuranate nor uranium oxide are explosive substances.



**12. Loading and dispatch**  
The drums of uranium oxide are dispatched and exported to overseas converters for further processing. At full capacity, the Processing plant can produce 4,500 tonnes of uranium oxide each year. **This step completes the Rössing Uranium production process.**

Our customers' operations



**13. Conversion**  
The uranium oxide is converted to uranium hexafluoride crystals. Conversion plants operate commercially in Canada, China, France, the UK, and the US. \*



**14. Enrichment**  
This step increases the concentration of the isotope uranium-235 (<sup>235</sup>U) from its naturally occurring level of 0.7 per cent to higher levels required for nuclear reactors — about 3 per cent. \*



**15. Fabrication**  
Enriched uranium is converted into uranium dioxide, formed into solid cylindrical pellets, sealed in metal fuel rods, and bundled into fuel assemblies. \*



**16. Power generation**  
Fuel assemblies are loaded into nuclear reactors where the <sup>235</sup>U fissions, producing heat and steam used to generate electricity. (\*Photos: www.aveva.com)



The many faces of  
Rössing Uranium in  
the community.



**Rössing Uranium Limited**

Registered in Namibia No. 70/1591

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