

2016 ANNUAL INTEGRATED REPORT

Your partner in unlocking mineral wealth



YOUR PARTNER IN UNLOCKING MINERAL WEALTH

As a global leader in minerals and metallurgical innovation, Mintek provides world-class R&D expertise, testwork, and process optimisation for all mineral sectors at international level.

The activities range from initial bench-top investigations to full process flow sheet development, pilot- and demonstration plant design and optimisation of industrial plants. Mintek employs about 700 staff, which include qualified and experienced engineers and scientists who are leaders in their fields of specialisation.



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1. INTRODUCTION

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COMMON VISION, SHARED VALUES AND CULTURE

The **mandate** of Mintek is to serve the national interest through research, development, technology transfer; to promote mineral technology, as well as to foster the establishment and expansion of industries in the field of minerals and products derived therefrom.

The **VISION** is to be a global leader in mineral and metallurgical innovation.

The mission is to serve our stakeholders by adding value to the mineral sector through research, development and technology transfer, in support of national priorities and sustainable growth.

In order to obtain our strategic intent, we **Operate** and **Strive** to

- Enhance our visibility and credibility to all stakeholders;
- Research and develop efficient mineral processing technologies and value added products and services;
- Promote the mineral-based economies of rural and marginalised communities;
- Uphold good governance practices; and
- Build world class R&D excellence.

The shared **Values** define what Mintek stands for as an organisation and determine the way in which Mintek interprets and responds to business opportunities and challenges. They also establish expectations about how staff work with their fellow colleagues, clients, suppliers, government departments and the communities that they serve.





1.2 CORPORATE PROFILE AND ORGANISATIONAL STRUCTURE

Mintek, located in Randburg, Johannesburg and founded in 1934 to assist the mining industry to operate more effectively and profitably, has achieved international recognition for its contributions. The local mining and minerals industry has been very innovative and many notable advances in extraction, refining, and manufacturing technology that originated in South Africa have impacted on the minerals industry worldwide.





The Mintek Campus, situated in Randburg.

1.3 MINTEK'S INTEGRATED VALUE CHAIN

Exploration	Mining	Concentration	Pyrometallurgy	Hydrometallurgy & Biotechnology	Refining & Value addition	General
 Geochemical sample analysis Mineral/ore characterisation Certified Reference Materials Artisanal and small-scale mining (ASSM) 	 ASSM Technology ASSM training assistance Mining inputs economic studies 	Comminution/Flotation/ Physical separation Bulk sample preparation Flowsheet design and optimisation and piloting Plant audits Ultrafine milling Control and optimisation strategies Gravity, magnetic, electrostatic, flotation and mineral density separation	 Pelletisation and briquetting Preheating and pre-reduction DC arc process development and piloting Modelling and simulation Submerged-arc furnace (SAF) control strategy Fluidised bed and controller technologies Fluidised bed and controller technologies Refractories performance investigations High temperature solid state and phase equilibrium investigations Ore, slag, matte and alloy characterisation 	 Atmospheric and pressure leaching Bioleaching (refractory gold and base metals) Solvent extraction and ion exchange Electrowinning Process simulation Reagent development and evaluation Gold recovery by CIP/RIP Activated carbon regeneration Uranium processing expertise Leach circuit control 	 Gold refining and value-added products/chemicals Pyrometallurgical refining of zinc and off-grade ferro- alloy fines Titanium chlorination technology New industrial applications for gold: catalysis, nanotechnology & biomedical "Smart" materials and sensors PGM-based superalloys Low-nickel stainless alloys Jewellery fabrication Gold and platinum jewellery alloys Identification of downstream metal- based industries 	 Ore characterisation, analytical and process mineralogy Certified Reference Materials and Materials characterisation, testing and development Engineering, design, manufacturing, installation and commissioning Project management services and regional mineral- based studies

1.4 MINTEK'S GLOBAL PRESENCE

Mintek operates in an open global environment, servicing a multi-national industry. Customers include state enterprises, conglomerates, junior resource companies, engineering contractors and small-scale enterprises – operating both locally and internationally. In such an environment, the imperatives of remaining competitive and credible in terms of reputation and facilities is widely acknowledged and appreciated. As such, Mintek remains committed to ensuring the long-term financial health performance and credibility of the organisation through the effective management of revenue and on-going compliance to governance structures.



GOLD	PGMS	FERROUS METALS	BASE METALS	INDUSTRIAL MINERALS & DIAMONDS
 Evaluation and design of recovery circuits for refractory and non-refractory mineralisation. Diagnostic leaching and comparative testwork on various comminution, concentration and recovery options. Cyanide speciation monitoring, online cyanide measurement and control, cyanide destruction. Assistance with ICMI gap or full certification audits. Minfurn™ technology for granular activated carbon regeneration. Minataur™ all- hydrometallurgical gold refining process. New industrial uses for gold - catalysis, biomedicine, and nanotechnology. 	 Design and optimisation of integrated comminution, flotation and smelting circuits. Design and optimisation of base metal recovery and PGM refining circuits. ConRoast smelting technology for high-chromium low-sulphur PGM materials. Catalyst development for automotive, fuel cell, and industrial applications. Novel PGM-containing alloys, and powder metallurgical processes. 	 Iron ore beneficiation. DC arc smelting processes for chromite, ilmenite, nickel laterites, magnetite, magnesium metal production, and metal recovery from slags and dusts. Materials characterisation (physical, mechanical and corrosion properties), and failure investigations. 	 Bioleaching of copper, nickel, cobalt, zinc and polymetallic concentrates. Heap bioleaching of low-grade chalcopyrite-bearing materials. Integrated circuit design for metal recovery and purification by leaching/heap leaching, precipitation, ion exchange, and SX/EW. 	 Physical beneficiation - comminution, flotation, gravity, dense media, electrostatic and magnetic separation, and optical sorting. Kimberlite indicator mineral investigations. Alluvial diamond provenance studies.





URANIUM	RARE EARTH ELEMENTS	ROCESS CONTROL	EQUIPMENT & TECHNOLOGY	ECONOMIC & REGIONAL STUDIES
 Ambient, pressure and heap leaching, solvent extraction, fixed bed and countercurrent (NIMCIX) ion exchange, resin- in-pulp, and ADU precipitation. Mintek is registered as a uranium testwork facility with South Africa's National Nuclear Regulator (NNR) and the Department of Mineral Resources. 	 Physical beneficiation – comminution, flotation, gravity, and magnetic separation, sensor based sorting. Concentrate cracking and refining flowsheet development and optimisation. 	 Advanced process control and optimisation strategies for milling, flotation, and leaching circuits, and submerged-arc furnaces. Online cyanide measurement and control. Heap leach operator guidance software and in-heap instrumentation. 	 Minfurn[™] regeneration furnace for activated carbon in the gold processing, water treatment, and food industries. MINATAUR[™] gold refining process. DC arc furnaces. Atomijet[™] atomiser for base and precious metals. SAVMIN[™] process for acid mine drainage purification. 	 Regional commodity-based mineral economic studies. Resource-based technology strategies. Sustainable mineral development studies.







2. STRATEGIC PERFORMANCE

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"Despite the global commodity slump over the last few years Mintek has continued its resilience and at year-end showed a relatively good surplus of R13.8 million."

2.1 CHAIRPERSON'S OVERVIEW

In 2015 and 2016, the mining sector, both in South Africa, and globally, faced one of its most difficult and challenging years in many decades. The slowdown in growth rates around the globe, particularly in China, which for many years has provided the impetus and support to high commodity demand and wellsupported markets, has resulted in depressed global demand. Last year I predicted that the mining sector would bottom out in late 2015, but the sector experienced prolonged gloom. However, in the past few months the gold price has surprisingly shown resilience giving hope that, as we predicted last year, increased project development and exploration might still be possible from 2017 onwards.

Despite the global commodity slump over the last few years Mintek has continued its resilience and at year-end showed a relatively good surplus of R13.8 million, albeit that this is understandably still far below our potential as experienced in 2009 and 2012. Given the prevailing global and national challenges affecting the minerals industry, Mintek remains well-positioned to deliver on its mandate to the government while continuing on the gains it has made as an international leader in minerals processing and metallurgical research, development and innovation.

Mining Phakisa, which was held towards the latter part of 2015, brought together industry stakeholders to develop implementable results that will transform the industry and increase investment, in line with the goals of the National Development Plan. The aim of the initiative was to galvanise growth, increase investment and create employment along the mining value chain, in relevant input sectors and in mining related communities. However, achieving this requires actively engaging with the immediate financial and employment challenges created by the global downturn in commodity prices as well as through designing initiatives that build a foundation for next generation mining systems, beneficiation technologies, capital goods production and sustainable community development. Mintek is currently waiting for the outputs of the Mining Phakisa so that it can play its role in the implementation of that strategy accordingly.

As called upon by the National Development Plan, Mintek continues to make a difference to the lives of ordinary South African citizens. Mintek has continued to provide technical and production assistance to the two training and beneficiation centres that were set-up and launched during the 2014/15 financial year in Prieska and Upington as part of the MTEF funded Northern Cape Gemstone project. These centres were set up specifically with a focus on market access and sale of products. Twenty one learners were trained on the grading of semi-precious gemstones, especially tigers eye, using simple techniques. During the 2015/16 financial vear, Mintek's Small Scale Mining and Beneficiation Division continued developing new technologies that enhance the lives of ordinary communities. In this regard, the Division developed a filter using sand, clay and activated carbon for purifying contaminated water resources. Training was conducted in the villages of Dzingidzingi and Letsitele in the Limpopo Province where 21 people were taught how to use the water filtration system. They were also assisted to understand the process involved in purifying water for drinking and food preparation. It is these forms of innovation that make a difference to the daily lives of the people of South Africa. The training was well received and fully supported by the community and ward councillors.

Looking forward, Mintek in collaboration with the SMMEs, who rely on Mintek's technical guidance and advice, will focus on developing technologies and incubating businesses related to recycling, waste treatment and urban mining. As such, it will continue to explore possibilities of expanding these "novel" technologies to the rest of Africa where there is increasing activity of small-medium enterprises in the mining and industrial sectors, for example in Zambia, Tanzania, Mali and Guinea.

Women representation featured strongly in the Mintek's 2015/16 programme, with management led by the Board working to ensure that there were no institutional barriers – either structurally or in policy in the organisation that could deter women representation. The focus was on creating an environment where women have a similar chance of succeeding as their male counterparts. To this end, Mintek intensified its efforts to increase women representation in the organisation. As a result, Mintek was able to make significant strides from a low 33% a year ago to 39% by the end of the financial year. A series of these interventions began with the successful hosting of the Women-in-Mintek Indaba in the first quarter of 2015, initiated by the Board and



executive management. On behalf of Mintek, I would like to thank Honourable Minister in the Presidency, Responsible for Women, Honourable Susan Shabangu for gracing this occasion and her support of this transformational initiative at Mintek.

This year, Mintek has increased its efforts to forge new collaborations and build on existing partnerships. In November 2015, Mintek attended the International Basic Research Infrastructure Meeting at the Embassy of Italy in Washington, D.C. with the purpose of exploring basic science partnerships by leveraging international investments in global research infrastructure. Mintek has been a strong, consistent participant in European Union collaborative research activities. Mintek remains the only non-EU member of the European Technology Platform for Sustainable Mineral Resources, which assists in formulating policy and research direction for the EU minerals industry. Mintek is also one of the leading South African participants in the EC Horizon 2020 programme, currently partnering in 6 projects. In Botswana Mintek signed a Memorandum of Understanding aimed at strengthening the working collaboration with the Southern African Development Community (SADC) region. There is a strong drive from the Botswana government to reduce export of steel scrap. The focus is to increase localisation, skills development, improve local production services and job creation.

On the local front, undergraduate students from the University of Limpopo's Physics Department visited Mintek in February 2016 as part of a two-day tour to Science Councils to gain exposure of science careers. In 2015, Mintek signed a Memorandum of Understanding with the University of Limpopo, which amongst others focuses on promoting programs that showcase Mintek's research knowledge and skills to students at the University.

Mintek's initiatives in support of the national priorities are also aimed at addressing the triple challenges of inequality, poverty and unemployment that are facing South Africa. This is done through continuous development and innovation of sound technologies to maximise ore resource extraction and utilisation. In this regard, Mintek endeavours to consider the future challenge (and opportunity at the same time) of extraction and utilisation of low grade, non-conventional and unexploited resources and complex ores using sustainable green technologies. Going forward, Mintek will continue to focus its research and development on renewable energy and water to address the electricity and water needs that might impact negatively on the South African mining sector.

There are many reasons for Mintek's success over the last 3 years, but the most important is the leadership and oversight of the Board of Directors who are stepping down. My fellow Board members were extraordinarily generous with their time and wisdom and they ensured that Mintek remained committed to its mission and guiding principles. Thank you to each of these Board members for their hard work and commitment to building a strong and effective organisation.

Our sincere gratitude goes to the previous Minister of Mineral Resources, Honourable Adv. Ngoako Ramatlhodi, the current Minister of Mineral Resources, Honourable Mosebenzi Zwane and the Deputy Minister of Mineral Resources, Mr Godfrey Oliphant for their continuous support during our tenure as Board of Directors.

We thank Mintek's President and CEO, Abiel Mngomezulu for leading a very strong, senior management team through a very challenging economic climate. Through their tireless efforts, strategic thinking and innovative ideas, Mintek continues to grow immensely. To the next Board of Mintek, I am handing over an organisation that has sound governance systems and policies in place, and has just achieved another "clean" audit. I am confident that you will do better than us even though we have set a high bar.

PP.

Adv Linda Makatini Chairperson





"As a science council, Mintek prides itself on Human Capital Development in ensuring a strong pipeline of young people coming into the organisation whilst also encouraging our employees to further their studies. This year a total of 22 employees graduated."

2.2 CHIEF EXECUTIVE OFFICER'S REVIEW

As predicted last year, the decline in commodity demand and prices with a concurrent drop in project activity continued into 2016. This has led to a further 18% drop in Mintek's commercial revenues. However, due to the entrenched culture of cost saving, an overall surplus of R13.8 million was achieved for the financial year, which is slightly higher than the budgeted surplus of R12.7 million. The downward spiral in mining activity is expected to ease somewhat during the latter part of the next financial year.

The launch of two significant facilities namely, the National DST/Mintek NIC Cleanroom facility and the Rare Earth Elements (REE) solvent extraction pilot plant, indicates the trust both the Department of Science and Technology (DST) and the Department of Mineral Resources (DMR) respectively have in Mintek hence a further investment in Mintek's infrastructure for the future of Research and Development in the mining industry. These two facilities are also indicative of the role Mintek intends playing in the rest of the continent as these two facilities are going to be shared with other scientists within the continent.

As part of the implementation of the National System of Innovation, Mintek had its institutional review which covered three broad categories, namely, the quality of output and outcomes from a scientific and technical perspective; the contribution of the output of Mintek to the realisation of national goals and the quality of the management of the institution.

The outcomes of the review showed that Mintek's core competencies are supported by world-class and unique laboratory-, pilot- and demonstration-scale facilities. Mintek was commended as a centre of excellence with significant multidisciplinary skills, particularly in the areas of pyrometallurgy, advanced materials, mining economics and strategy and hydrometallurgy. The review also indicated that, internationally, Mintek has a reputation as a world class research organisation in mineral processing. The review further found that Mintek's initiatives in support of the national priorities are aimed at addressing the triple challenges of inequality, poverty and unemployment facing South Africa. The review panel endorsed Mintek's relationships with higher education institutions as sound and commended Mintek on strides on the transformation front, especially on attracting persons with disabilities.

FINANCIAL HIGHLIGHTS

The R13.8 million surplus achieved by Mintek this year is slightly lower than the R17.6 million surplus achieved during the previous financial cycle. This is indicative of the environment in which we operate. While the decline in commercially funded mineral technology work is recognisable by the 18% decrease in income generated through products and services, the cost containment culture ensures a strong balance sheet. Mintek maintains a balance sheet with more than R750-million worth of assets and a liquidity ratio of 2.2. Increased state funding, short term deposits and technology licence fees are other important contributions towards the overall financial achievement. There is still a serious concern regarding the year-on-year slow growth but we anticipate increased investor interest resulting in an improved financial stance leading to more commercial activities and stronger income streams during the latter part of the next financial year.

SAFETY, HEALTH, ENVIRONMENT AND QUALITY (SHEQ)

Mintek's Analytical Services Division celebrated 20 years of unbroken SANAS 17025 accreditation as a certified laboratory for testing and calibration. Mintek's Cyanide Centre retained its SANAS 17025 accreditation as a certified laboratory for cyanide analysis. This laboratory provides a revenue stream from legally required cyanide monitoring programmes at gold processing facilities in South Africa and abroad.

For another consecutive year, Mintek passed a recertification audit against ISO 9001:2008 (quality), ISO 14001:2004 (environmental management) and OHSAS 18001:2007 (safety and health) standards. The lost time incident







frequency rate (LTIFR) at the end of the year was well below the target of 1 at 0.3 and there were no fatalities. The client satisfaction frequency rate (CSFR) was measured at 97%, which is well above the 90% target. There were no major health or environment incidents over the year resulting in both, the health incident frequency rate (HIFR) and the environmental incident frequency (EIFR) being 0 and below the target of 1. Unfortunately Mintek did not achieve the target of 1 for public dissatisfaction where there were 3 incidents. Preventing further complaints will remain our priority and we will put more effort in improving this.

PEOPLE DEVELOPMENT

As a science council, Mintek prides itself on Human Capital Development in ensuring a strong pipeline of young people coming into the organisation whilst also encouraging our employees to further their studies. This year a total of 22 employees graduated. However, this number is slightly less than last year, indicative of plateauing of the number of employees who require further studies. Mintek will continue encouraging its employees to also focus on acquiring short term management skills to complement their core technical skills.

Mintek continue to encourage women in science and technology and has increased the total percentage of women from 33% in the previous year to 39% in this financial year. As part of a series of interventions to attract more women, Mintek hosted the first "Women in Mintek Indaba" in June 2015. Female employees were given a platform to raise concerns, share opinions, discuss achievements

and explore ways of creating an enabling environment for aspiring young women.

TECHNICAL HIGHLIGHTS

There were several technical highlights during the course of the year including the successful completion of a new pilot plant smelting campaign for the recovery of gold from waste material. In total, 2500 tons of waste material was processed over a 6 month period with more than 90% recovery of gold from difficult-to-treat materials.

Another notable output was the development of a handheld version of Mintek's Laboratory "Lab" Cynoprobe. The Lab Cynoprobe was developed several years ago to broaden the impact of Mintek's cyanide measurement technology and more than 15 of these units have been sold in recent years. The drawback of the existing Lab Cynoprobe unit is the high cost associated with manufacturing the instrument. A cost comparative study between the hand-held version and its bulky counterpart indicates an expected manufacturing cost reduction of greater than 70% between the old Lab Cynoprobe and new hand-held Cynoprobe.

The XRT coal sorting project, conducted as part of the Medium Term Expenditure Framework (MTEF) program, was introduced to demonstrate the successful application of the XRT ore sorting technology. Currently, there is a critical need to increase Eskom's coal supply in order to address the energy crisis in South Africa. The quantity and quality of coal required by Eskom are driving factors to meet the country's electricity demand. Mintek is in the process of evaluating

XRT ore sorting technology to specifically upgrade coal to a range of high quality products. XRT technology is widely used in the coal industry, but in de-stoning (waste rejection) applications. Successful production of high grade coal using XRT technology will benefit the South African coal industry as well as the Mining industry in several areas.

Mintek's BOFLUX project aims to demonstrate potential energy and recovery benefits through small additions of boron-containing minerals to ferrochromium smelting processes. Mintek is collaborating with EtiProducts (Finland) and Siyanda Chrome Smelting Company (South Africa) on this project and the test work conducted showed significant potential benefits for low-grade chromite sources. The provisional laboratory tests completed during the year will be followed by larger pilot-scale tests to confirm the bulk behaviour of this proposed process.

Interestingly, there has been a significant increase in gold enquiries from smaller gold mines relating to the small scale Minfurn which has a throughput of 3kg/h. Mintek is currently working on finalising a commercial design at this scale.

Over the last year, the Mine Effluent Treatment projects focussed on two main objectives namely securing a suitably polluted site and identifying relevant Mintek technologies to be used in the remediation of the identified site. Robinson Lake in Randfontein was selected as a suitable site to demonstrate Mintek technologies. A conceptual flow sheet was developed to determine the most appropriate technologies to be used in the remediation process. The Mintek technologies that were identified include: SAVMINT^M,



MetRIXTM (resin in pulp), NIMCIX, biological sulphate reduction, silicate encapsulation, biological oxidation and ion exchange membrane and bead technology. These will be investigated further in the new financial year.

The second mine rehabilitation contract between the Department of Mineral Resources and Mintek came to an end on 31 March 2016. The programme formally commenced with the conclusion of a contract between the parties on 06 June 2013 and the funding became available in September 2013. The original budget of R165 million was supplemented with additional allocations of R55.5m. Achievements over the last year include rehabilitation of four mine sites viz. Mang-le-mang, Betle, Sithilo and Ga-Madiba as well as completions of designs for Streatham, Bosrand and Heuningvlei housing projects. We are currently finalising the terms for a new 3 year contract.

LOOKING AHEAD

Mintek will focus on strengthening several key partnerships through notable outputs. Also, Mintek will continue to build on achievements made so far in strategic areas that have high impact on water and energy, for example, energy usage during crushing and milling, underground processing, waterless and low water processing.

It is with great sadness that during the course of the year we lost two Mintek stalwarts in Professor Robbie Robinson and Mr. Gibson Thula. Robbie Robinson was the first Director of the Government Metallurgical Laboratory and later Director General of the National Institute.

MA Mngomezulu President & CEO, Mintek 2016







From left to right: Advanced Leach Facility (ALF);		
Rehabilitation of derelict and ownerless mines: (a) Mahlatjane,	(b)	Strelley

2.3 KEY PERFORMANCE INDICATORS (KPIS)



STRATEGIC OBJECTIVE	ENHANCE MINTEK'S VISIBILITY AND CREDIBILITY TO ALL STAKEHOLDERS						
PROGRAMMES	MEASURES / OUTCOMES	PERFORMANCE INDICATOR	TARGET	ACTUAL	COMMENTS		
Integrated marketing and communication functions	Updating and implementing the marketing and communications plan	Annually updated marketing and communications plan approved and implemented	1	1	Target achieved		
	Mintek promotion	Number of technical articles in credible publications	35	61	Targets exceeded due to higher		
	Winter promotion	Number of conference presentations and posters	65	126	participation of staff at conferences.		
		Number of Patents filed	5	10	Targets exceeded due to increased		
	IP creation and transfer	Number of IP license agreements	2	4	awareness of the importance and need to identify, document and report IP within		
		Number of discoveries (IPR-PFRD Act)	10	14	Mintek to the Office of Technology Transfer.		
	Attained annual customer satisfaction target	Annual Customer Satisfaction Rating Index	90	97	Target exceeded indicating that more and more customers are satisfied with Mintek's business.		
Enhancing the visibility	Enhanced media exposure	Advertising Value Equivalent (AVE) in R million	25	29	Target exceeded due to intensified efforts to make Mintek more visible locally and abroad.		
and credibility of Mintek	Enhanced relations with oversight bodies	Technical assistance to the DMR (upon request)	1	2	Target exceeded due to Mintek's attendance at Operation Mining Phakisa which was unplanned.		
		Presentations to Parliament on impact of Mintek's work and role	2	2	Targets achieved		
		Timely submission of Shareholder's Compact	1	1	Targets achieved		
		Timely submission of quarterly reports on the attainment of targets in the scorecard	4	4	Targets achieved		
	Regional integration of staff exchange	Number of visits and instances of staff exchange	4	4	Target achieved		



STRATEGIC OBJECTIVE	2 ADDED PRODU	D DEVELOP EFFICIENT MIN CTS AND SERVICES	NERAL P	ROCESS	SING TECHNOLOGIES & VALUE	
PROGRAMMES	MEASURES / OUTCOMES	PERFORMANCE INDICATOR	TARGET	ACTUAL	COMMENTS	
	Develop analytical and mineralogical	# of methods	11	17	Target exceeded due to unplanned method development requests by clients.	
	methods and supply of services	Rand value (Rm)	48.0	37.7	Target not achieved due to the current unfavourable market conditions.	
		# of internal reports	40	91	Target exceeded as during the execution of B&D there were unexpected discoveries	
	Develop new technologies under Science Vote funding	# of new technologies	5	8	leading to new technologies.	
Compatitiva		# of prototypes evidenced by reports	5	5	Target achieved	
Competitive technologies, products and services for optimal mineral resource utilisation		# of reports	16	13		
	Sales of products, plant and equipment	Rand value of control system sales (Rm)	26	24	Target not achieved due to continuing poor economic market conditions.	
		Rand value of Certified Reference Materials (CRM) sales (Rm)	4.5	4.4		
	Commercial investigations and feasibility studies	# of external reports	120	153	Target exceeded due to increased demand for commercial work in some commodity areas.	
	Provision of Mineral Economics and Strategy advice	# of internal reports	8	10	Target exceeded due to MESU receiving more internal requests for work during the year from the other technical divisions.	
	Develop applications for precious-, ferrous- and base metals in the areas of: - Biomedicine (HIV, cancer, malaria) - Catalysis (chemical processing, fuel cells, environmental) - Nanotechnology (water, health) - Physical metallurgy R&D and metallurgical industry support	# of internal reports	16	17	Target exceeded	
		# of external reports	15	15	Target achieved	
Beneficiation to value added products and services		# of reports from the Metals Technology Centre (MTC)	140	181	Targets exceeded	
	Develop metallurgical processes and products for base-, light- (titanium, magnesium) and ferrous metals	# of internal reports	8	9		

STRATEGIC Processing Technologies & Value OBJECTIVE 2 RESEARCH AND DEVELOP EFFICIENT MINERAL PROCESSING TECHNOLOGIES & VALUE OBJECTIVE 2 Continued from previous page

PROGRAMMES	MEASURES / OUTCOMES	PERFORMANCE INDICATOR	TARGET	ACTUAL	COMMENTS
Green technologies	Develop water efficient processes and flow sheets to optimise water	# of internal reports	5	16	Targets exceeded due to a decrease in demand
	consumption and enable processing of ore bodies in water stricken areas	# of external reports	4	5	tor commercial work, resulting in more work being done under the water and energy clusters.
	Develop energy efficient processes, flow sheets and control technologies that minimise energy consumption and carbon emissions	# of internal reports	8	13	Toronto and data to according to a single
		# of external reports	4	7	largets exceeded due to more queries received.
	Develop waste management and recycling technologies for treating and recycling waste in order to extend mineral resources	# of internal reports	6	18	Target exceeded
		# of external reports	1	1	Target achieved
	Rehabilitate derelict & ownerless mine sites	# of sites	4	4	Target achieved

STRATEG	IC
OBJECTI	/E

3 PROMOTE THE MINERAL-BASED ECONOMIES OF RURAL AND MARGINALISED COMMUNITIES

PROGRAMMES	MEASURES / OUTCOMES	PERFORMANCE INDICATOR	TARGET	ACTUAL	COMMENTS
Development of technologies and strategies relevant to	Establish technologies and strategies relevant to small scale	# of technologies adapted or developed	2	2	Target achieved
rural and marginalised communities	and marginalised communities	# of feasibility reports	10	15	Target exceeded due to more studies being conducted.
		# of new businesses created	5	5	Target achieved
Economically sustainable businesses	Develop and support	# of jobs created from new businesses	60	33	Target not achieved due to groups/ businesses not having sufficient members.
created in rural and marginalised communities	economically sustainable rural and marginalised communities	% of businesses still in existence after 1 year	95	100	Target exceeded as all 5 businesses set- up in 2014/15 are still in existence.
		% of businesses still in existence after 2 years	70	71	Target achieved as 46/65 of SMME's are still in existence after 2 years.
Training and skills development interventions in rural and marginalised communities	Provide value-added beneficiation training relevant to rural and marginalised communities.	# of people trained	60	67	Target exceeded due to increased need by communities and municipalities for training resulted in more learners being registered on programmes.
		Maintain accreditation in jewellery manufacturing / design and small scale mining as evidenced in certificate or report	Maintained	Maintained	Accreditation valid till 10/02/2018
Training and skills development interventions in rural and marginalised communities	Provide value addition training in glass beads making and ceramics	# of people trained	60	72	Target exceeded due to training needs by communities and municipalities.



STRATEGIC OBJECTIVE	4 UPHOLD GO	OD GOVERNANCE PRACTICES	\$		
PROGRAMMES	MEASURES / OUTCOMES	PERFORMANCE INDICATOR	TARGET	ACTUAL	COMMENTS
Enhanced fiscal discipline and the effective	BEE procurement as a % of total discretionary spend	% BEE Spend of total discretionary spend	60	95	Target achieved
management of resources	Strengthened Internal Financial Controls	Unqualified audit as evidenced in audit report	Unqualified	Unqualified	Target achieved for 2014/15
		% Debtors write off of total revenue	< 0.5	0	-
	Sound Debtor Management	Average Debtors Days	< 65	52	largets exceeded
	Total Income	Rand Value (R'000)	532 453	526 800	Target not achieved as a result of lower than anticipated commercial revenue due to the unfavourable economic climate.
	Net Result (surplus)	Rand Value (R'000)	12 693	13 797	
	Optimal Yield on Investment	Rand Value (R'000)	17 000	32 836	Targets exceeded
	Total Capital Expenditure	Rand Value (Including Funding) (R'000)	45 375	59 696	
	Maintained balance between R&D and Commercial Revenue streams	Ratio of Research / Total Revenue expressed as a %	55	69	Target not within range due to limited commercial income received.
	Maintained balance between TCTC Salary Bill/Total Expenditure	Ratio of TCTC Salary Bill / Total Expenditure expressed as a %	55	58	Target within range
	Enhanced Liquidity Ratio	Liquidity Ratio	>2.0	2.2	Target achieved
	Improved cash flows from operations	Cash generated from operations after working capital (excluding movements in deferred income) (R'000)	>2 000	8 168	Target exceeded
Enhanced organisational efficiencies	Productivity Ratio	Recoverability %	85	93	Target exceeded
	Energy Efficiency	Power factor correction	<1.0	0.96	
	Implementation of ICT Master Plan	Successful implementation of a master systems plan	Upgrade of email system to Exchange 2010	Achieved	Targets achieved
	Monitoring of critical facility availability	Upside / availability of critical facilities (%)	90	98	Target exceeded

STRATEGIC OBJECTIVE	UPHOLD GOOD GOVERNANCE PRACTICES (Continued from previous page)				
PROGRAMMES	MEASURES / OUTCOMES	PERFORMANCE INDICATOR	TARGET	ACTUAL	COMMENTS
Compliance with national and international regulatory frameworks, and applicable standards	Compliance with appropriate standards, regulations and legislation	% achievement of compliance checklist	100	100	Target achieved
	Internal Audits conducted	No. of audits	16	20	Target exceeded
	Review of the Audit Committee Charter	No. of reviews	1	1	Target achieved
	Fraud Awareness Campaigns	No. of campaigns	8	11	Target exceeded.
Enhanced Safety, Environment and Quality	SHEQ standards maintained and enhanced	Maintain Mintek accreditation status	Maintained	Maintained	Accreditation maintained throughout the year.
		Achieve target for fatalities	0	0	
		Achieve target for LTIFR	< 1.0	0.3	largets achieved

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STRATEGIC PERFORMANCE



STRATEGIC OBJECTIVE	5 DEVELOP HUMAN CAPITAL AND ORGANISATIONAL SKILLS TO BUILD WORLD CLASS R&D EXCELLENCE					
PROGRAMMES	MEASURES / OUTCOMES	PERFORMANCE INDICATOR	TARGET	ACTUAL	COMMENTS	
	Enhanced Skills Development	WSP Compliance Report	1	1		
		Total spend on training expressed as a % of payroll	2.0	2.0	Targets achieved	
	Enhanced relationships with	Number of partnerships in place	5	7		
Training and Skills Development	and other similar organisations.	# of partnerships with previously disadvantaged Higher Education Institutions	2	4	Targets exceeded due to agreements that were signed with additional providers as part of the Minquiz competition and participation in unplanned career fairs.	
		# of Graduate Recruitment Programmes and other Science Events	12	14		
	Science, Technology, Engineering and Maths (STEM) Promotion	Annual Minquiz competition	1	1	Target achieved	
	Effective Full-time Bursary Programme	# of under-graduate bursars	12	18	Target exceeded. 9 New undergraduate bursars were granted in quarter 4 as per business needs whilst 9 continue to complete their studies.	
		% Under-graduates Absorption Rate	100	100		
		# of post graduate bursars	13	13	Targets achieved	
		% Masters Graduates Absorption Rate	100	100		
		% Doctoral Graduates Absorption Rate	100	100		
	Effective Part–time Bursary Programme	# of under-graduate bursars	40	43	Targets exceeded. The number of part- time students fluctuates throughout the	
		# of post-graduate bursars	51	74	year according to academic calendar.	

STRATEGIC OBJECTIVE	5 DEVELOP HUMAN CAPITAL AND ORGANISATIONAL SKILLS TO BUILD WORLD CLASS R&D EXCELLENCE (Continued from previous page)				
PROGRAMMES	MEASURES / OUTCOMES	PERFORMANCE INDICATOR	TARGET	ACTUAL	COMMENTS
Training and Skills Development (Continued)	Work-Integrated Learning,	# of Candidates enrolled	120	148	Targets exceeded due to the
	Studentships and Internship Programmes	% Trainee Absorption Rate	5	5	students throughout the year, depending on grant allocation.
	Artisan Learnership Programme	# of Employees enrolled	8	15	Target exceeded. There were 9 internal learners completing their studies and 6 external learners were granted learnerships.
		% Retention of internal learners	100	100	Target achieved
	Development Programmes for recent graduate scientists & engineers	Graduate Development Programme review report	1	1	Target achieved
	Development Programme for mid-level professionals, including researchers, scientists, engineers and technicians	An approved programme for mid- level Professional Development	1	2	Target exceeded as a Project management training course & a simulation-based design for resource efficiency of metal production programme was hosted for researchers.
Organizational Development	Transformation of the Mintek Organisation	Report on compliance with DoL regulations	1	1	Target achieved
		% of women at Mintek (towards achievement of Employment Equity targets)	45	39	Target not achieved although slow positive trend continues.
		% employees with disability (towards achievement of Employment Equity targets)	3	3	Targets achieved
		Interventions to increase women representation in Mintek	1	1	Targets achieved
		Overall % of designated groups (towards achievement of Employment Equity targets)	90	89	Target not achieved although positive progress continues.
	Structured mentorship programme to transfer skills and knowledge from specialists to mid-level professionals	% of employees participating in structured interactions between specialists and mid-level professionals	10	32	Target exceeded as there were more participants than envisaged, after a company-wide training programme.



STRATEGIC OBJECTIVE	5 DEVELOP HUMAN CAPITAL AND ORGANISATIONAL SKILLS TO BUILD WORLD CLASS R&D EXCELLENCE (Continued from previous page)					
PROGRAMMES	MEASURES / OUTCOMES	PERFORMANCE INDICATOR	TARGET	ACTUAL	COMMENTS	
Organizational Development (Continued)	Compliance with Performance	% Performance Contracts done and signed (for qualifying employees)	100	100	Targets achieved	
		% Performance Assessment done and signed (for qualifying employees)	100	100		
	Enhanced Experience Profile of Researchers	Average years of Mintek experience of researchers	4	7	Target exceeded as there are more people retained at Mintek than those leaving, hence a net gain in years of experience.	
		Average Age of researchers at Mintek	35	35	Target achieved	
	Proportion of Researchers to Total Staff	Proportion expressed as a %	40	33	Targeted not achieved	
	Proportion of staff with Masters degree	Proportion of staff with Masters degree expressed as a %	10	12	Target exceeded. There is a push for employees in Mintek to obtain postgraduate qualifications (correlated to increase in part-time postgraduate studies target exceeded.	
	Proportion of staff with Doctoral degree	Proportion of staff with Doctoral degree expressed as a %	5	5	Target achieved	
	Enhanced staff Retention & Succession	Staff Turnover rate	9	10	Target not achieved when including retirees.	
		% Staff Turnover of Professionals in Mintek core Divisions	10	10	Target achieved	
		% of Core to Support employees	75	78	Target exceeded due to better efficiencies in structuring of support services.	
	Effective Leadership Development Programme	# of employees benefiting from Leadership Development Programme	35	31	Target not achieved	
	Conduct skills audit	Skills gap analysis report	1	1	Target achieved	
	Succession planning	# of succession planning initiatives	1	1	Target achieved - Organisational Culture survey conducted and task teams convened to look at career and succession planning.	
Employee Health and Wellness		# of Employee Wellness Programme interventions	4	10	Targets exceeded due to more than	
	Enhanced Employee Health	% of Working days lost to absenteeism	3.5	3.0	anticipated wellness interventions.	
		% compliance with obligatory annual medical assessment	100	100	Targets achieved	
Effective human resource systems	Data verification and cleaning	Quarterly data control audits – accuracy %	95	99		







3. GOVERNANCE & REMUNERATION

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3.1 BOARD MATTERS

GOVERNANCE & REMUNERATION

The Board of Directors plays a fundamental role in corporate stewardship and performance. The primary function of the Board of Directors (the Board) is to provide effective leadership and strategic direction to enhance the long-term value of the organisation to its shareholders, according to the Mineral Technology (Mintek) Act and the Mintek Board Charter. The Board has overall responsibility for reviewing Mintek's strategic plans and performance objectives, financials, operations, funding and investment proposals and legislative and corporate governance in terms of the Mintek Act, the Public Finance Management Act and other relevant requirements of reports on Corporate Governance matters for South Africa.

Other duties of the Board include:

- Appointing the CEO and approving remuneration policies
- Overseeing succession planning for senior management
- Overseeing the process for evaluating the adequacy of internal control, risk management, financial reporting and compliance

3.2 THE BOARD OF DIRECTORS

All directors exercise due diligence and independent judgement and make objective decisions in the best interest of Mintek. The members of the Mintek Board and committees are as follows:

NAME OF DIRECTOR	BOARD APPOINTMENTS	BOARD & COMMITTEES					
	EXECUTIVE	NON- EXECUTIVE	INDEPENDENT	BOARD	AUDIT AND RISK	HUMAN Resources	TECHNICAL
Adv. Linda Makatini		\checkmark		Chair			
Abiel Mngomezulu	√			Member	Member	Member	Member
Adv. Derick Block		\checkmark		Member		Chair	Member
Khomotso Mthimunye		\checkmark		Member	Chair		
Imraan Patel		\checkmark		Member			Chair
Dr Vuyelwa Toni Penxa		\checkmark		Member		Member	
Dr Chris Nhlapo		\checkmark		Member			Member
Nompumelelo Zikalala		\checkmark		Member	Member	Member	
Cathy Leso		\checkmark		Member	Member		
Sakhi Simelane					Member		
Gugulethu Nyanda						Member	
Peter Craven					Member		Member
Makhapa Makhafola							Member
Alan McKenzie							Member
Mpoti Moalusi			\checkmark		Member		
Tumi Hlongwane			\checkmark		Member		



Non-executive directors

Adv. Linda Makatini

LLM International Law; BA Law (LLB)

Advocate Linda Makatini is the CEO of Ngwane Mining, former chairperson and now member of the State Diamond Trader Board and member of the National Energy Regulator of South Africa. She is formerly the chairperson of the Petroleum Agency of SA and legal advisor to the deputy president of South Africa from 1999 to 2005. Prior to that she was the legal advisor to the Minister of Minerals and Energy. Adv Makatini also chairs the Jacob Zuma Educational Trust.

Dr Vuyelwa Toni Penxa

PhD in Public Affairs; MSc in Science Education; BSc; P.D.E; BEd

Dr Vuyelwa Toni Penxa is the Managing Director of liNgcaphephe Metallurgical Services (IMS), a company that specialises in the provision of chemical analytical services to the coal mining industry. She is formerly the managing director of Onderstepoort Biological Products (a State-owned company mandated to research and manufacture animal vaccines and other related biological products), CEO of the Safety and Security SETA (SASSETA) and Director for Quality Assurance and Development at the South African Qualifications Authority (SAQA). Dr Toni Penxa has extensive experience in science and mathematics education and training and she holds an MSc degree and a PhD in Public Affairs, focusing on Policy Development and Implementation.

Khomotso Mthimunye

B.Com; B.Compt (Hons); Higher Diploma in Tax Law; Chartered Accountant (SA)

Khomotso Mthimunve is a chartered accountant and the managing member of KR Mthimunye CA (SA) where her responsibilities include provision of general financial, accounting and auditing services, analysis of operational efficiencies and evaluation of policies and procedures. She is also a part time member of the National Energy Regulator of SA and also serves on the Boards of both private and public companies including the State Information Technology Agency, Council for GeoSciences and the audit committees of the Central Energy Fund and Strategic Fuel Fund. Her corporate experience was acquired at companies including BHP Billiton SA, where she was Manager: Strategy and Business Development, Gensec Bank and ABSA and Thebe Investments Limited.

Advocate Derick Block B. Iuris, LL.B. H Dio Tax

Advocate Derick Block is serving a second three-year term on Mintek's Board of Directors. An Advocate of the High Court of South Africa, Adv Block has been involved in law since 1994 and is a specialist in commercial law, procurement and contracts. He has held various executive management positions. He has served on the Boards of the Medical Research Council, National Regulator for Compulsory Specifications, the Council for Built Environment and the Johannesburg Roads Agency and is currently a Board member at the Overberg Water. He is also on the audit committee of the Free State Department of Agriculture.

Imraan Patel BSc Hons; PDM: PPDA

Imraan Patel is the Deputy Director-General at the Department of Science and Technology responsible for socio-economic innovation partnerships. He is charged with establishing strategic partnerships with other national, provincial, and local government departments as well as industry and science councils with respect to using science and technology for economic and social development. He was previously Programme Manager: Research and Knowledge Management at the Centre for Public Service Innovation where he was tasked with strengthening knowledge and action on innovation through knowledge sharing and management. Mr Patel has extensive experience in the management of research and policy processes.

Dr Chris Nhlapo

PhD; M.Sc; Hons. B.Sc; HEd

Dr Chris Nhlapo is the deputy vice-chancellor for research, technology Innovation and partnerships at the Cape Peninsula University of Technology, a position he has held since 2008. Dr Nhlapo has held several academic and executive management positions at various universities and institutions including as Manager: SA/UK Networks, NRF; Manager: Institutional Research Development Programme, NRF and Manager: Institutional Chairs for Entrepreneurship. He was also deputy dean of the faculty of natural and agricultural sciences and head of chemistry at the University of the Free State. He was also commissioner of the International Union of Pure and Applied Chemistry (IUPAC).

Nompumelelo Zikalala BSc Chem Eng

BSC Chem Eng

Nompumelelo Zikalala started her mining career as a De Beers bursar while pursuing a BSc Chemical Engineering at Wits University and she has since worked in various leadership roles at De Beers before she became General Manager at Kimberley Mines, a position she occupied prior to moving to Voorspoed. Ms Zikalala chairs the Ponahalo/De Beers Equal Allocation Trust and is passionate about development of young people.

Cathy Leso

BTech in Business Administration, NDip in Information Technology

Cathy Leso is the Chief Information Officer at the Department of Mineral Resources. She is responsible for business investments, providing efficient systems and overall business enablement as well as resource, stakeholder and overall ICT management. She was previously a Portfolio Manager at Standard Bank responsible for implementation of IT and strategic projects. Ms Leso has excellent strategic leadership skills and ICT, stakeholder management and solution delivery expertise.







budget, major procurement, major projects, structure and major policies.

EXECUTIVE MEMBERS

EXECUTIVE MEMBERS

President and Chief Executive Officer

MSc Engineering (Mining), BSc Hons (Geology)

Abiel Mngomezulu

Sakhi Simelane

Diamond Trader.

3.3

MBA, BCom Hons (Auditing), BCom

Chief Financial Officer Finance, Auditing and General Management

Gugulethu Nyanda BPaed, BA Hons; Dip. HRM

General Manager: Corporate Services Human Resources Management, Strategic Planning, Communications, Integrity & Compliance Management and General Management

Peter Craven

BSc (Chem Eng),

The Executive management team operates at the highest level of the organisation and has the day-to-day responsibilities of managing the organisation. This team prepares and guides the development of the organisation's processes and business operations and handles, in particular, the organisation's strategy,

Abiel Mngomezulu is the current President and CEO of Mintek, a non- executive director of the African Exploration, Mining and Finance

General Manager: Business Development Management of commercial operations, Large Construction Projects, Strategic R&D Programmes and Technology Commercialisation

Dr Makhapa Makhafola

PhD (Analytical Chemistry), MSc, Post-Graduate Diploma in Project Management, BSc Hons

General Manager: Research and Development Analytical Chemistry, Quality Assurance and General Management Alan McKenzie MSc, BSc Hons

global leader in mineral a metallurgical innovatior

General Manager: Technology Pyrometallurgy, Minerals Processing and General Management

3.4 CORPORATE GOVERNANCE REPORT

GOVERNANCE FRAMEWORK

GOVERNANCE & REMUNERATION

In line with global best practice, Mintek endeavours to ensure that business processes, systems and controls are governance compliant while ensuring efficiency in business. As a science council, Mintek plays a critical role within the South African landscape in respect of research, innovation, service delivery, development and growth.

Mintek operates within the framework of a variety of relevant legislation. These are:

- The Mineral Technology Act No. 30 of 1989;
- The Public Finance Management Act, which also governs Mintek and finance management related matters perspective as a Schedule 3B Company;
- The King III Report which aims at promoting best practice in corporate governance across organisations and applies to public entities and public enterprises that fall under the PFMA; and
- The Governance Protocol which provides guidance to the public sector and its entities operating within the political-economic sphere. While the Protocol applies to Mintek it does not seek to supersede the King Code, but rather amplify the requirements. According to The Protocol, Boards constitute a fundamental base of corporate governance, and as such, Mintek must be headed and controlled by an effective and efficient Board appointed in terms of the Mineral Technology Act.

THE BOARD

The Board, as the ultimate governing body of Mintek, believes that strong corporate governance is fundamental for the achievement of sustainable value for all stakeholders. Accordingly, Mintek is committed to the principles of openness, integrity and accountability in all its dealings with its stakeholders. Mintek endorses the Code of Corporate Practices and Conduct as set out in the King III Reports and prescribes to the Public Finance Management Act (PFMA). The Board as an oversight body firmly believes that the primary objective of the corporate governance system is to ensure that both the Board and management carry out their responsibilities ethically and effectively.

DELEGATION BY THE BOARD

The Board has delegated certain functions and responsibilities to various committees of the Board. These committees are the Audit and Risk Committee (ARC), the Human Resources Committee (HRC) and the Technical Committee (TC). Each of the three committees has its own terms of reference (ToR). These committees have authority to interrogate particular issues and report back to the Board with decisions and recommendations. However, ultimate responsibility of all matters remains with the Board.

The current Board has been in office since 1 April 2013 and members will complete their three-year terms on 31 March 2016.

APPOINTMENTS

Board members were appointed based on their business acumen, experience and knowledge as well as other relevant skills. The Board is accountable to the Minister of Mineral Resources and as a result a shareholder performance agreement (the Compact) has been concluded between the Board and the Executive Authority. The Compact entails strategic objectives to be achieved and forms the basis for quarterly performance reporting to the Executive Authority on these objectives. Mintek has a Board secretariat that is responsible for ensuring Board support to enhance maximum Board functioning.

WORK METHODS AND PROCESS

Dates of board and committee meetings are scheduled and communicated well in advance. To assist the directors in planning their attendance, the board secretary consults with the directors before fixing the dates of the meetings. The Board meets at least four times a year. As warranted by particular circumstances, ad hoc meetings are also convened to deliberate on urgent, substantive matters. The Board reserves at least one day per year to discuss the strategic long-term plan of Mintek. Board meetings, with the exception of certain in-camera sessions, are attended by all members of executive management. Furthermore, selected members of executive management and senior management participate in certain committee meetings.

Mintek also conducts an orientation programme which is presented by executive management, to familiarise new directors with business and governance policies. This programme gives directors some understanding of Mintek's business operations to enable them to assimilate into their new roles.

STATEMENT

The Board hereby considers Mintek's annual financial statements to be a fair representation of its financial position at year-end in terms of the South African Statements of Generally Accepted Accounting Practice (GAAP) and as required by the Public Finance Management Act. The Board Secretariat conducts an annual assessment of the effectiveness of the Board as a whole, effectiveness of the committees and individual contributions. The assessment comprises self-assessment, board assessment and peer evaluations.

BOARD COMMITTEES AND THEIR FUNCTIONS

Three committees assist the Board in discharging its duties and responsibilities. These are the ARC, the HRC and TC. The functioning of these committees is guided by Board approved Charters and ToRs which are reviewed annually.

Board and committee meetings are held in an atmosphere of intellectual honesty of purpose, veracity and mutual respect, requiring reporting of the highest standard by management and robust and constructive challenge and debate among all Board and committee members.

The key activities of the Board and its committees during 2015/16 FY were aimed at promoting the economic sustainability of the business and on delivering on Mintek's mandate. To this end, the work of the Board and committees ensured that Mintek's operations were conducted with due regard to the expectations and needs of all its stakeholders, the safety and health of employees and the communities that Mintek serves, and the development of effective systems which ensure proper access to and dissemination of credible information.


COMMITTEE OBJECTIVES	HIGHLIGHTS OF ACTIVITIES FOR THE YEAR		
The Audit and Risk Committee (ARC)			
The ARC assists the Board in discharging its duties relating to: effectiveness and efficiency of operations, safeguarding	Approved amendments to the cash management and investment policy, the project costing and pricing policy, the asset management policy and the ICT policy		
of the company's tangible and intangible assets, compliance with applicable laws, regulations and supervisory requirements,	• Approved the ARC & internal audit charters, the internal audit 3-year strategic plan as well as components of the shareholder agreement dealing with group financials and risk management		
reliability of reporting, the operation of adequate systems and	Approved the Mintek audit strategy for 2016		
reporting and statements in compliance with all applicable legal requirements and accounting standards.	 Discussed and monitored IT steering committee activities, internal audit quarterly reports, tip-offs and theft and fraud quarterly reports 		
	Approved the audit and risk committee report for inclusion in the Mintek annual report		
	Discussed and monitored risk steering committee activities and amended the risk plan accordingly		
	Approved the audited financial statements for 2015		
	 Through consultation and agreement with the AGSA, approved the Mintek group management and audit reports for 2015 		
	Discussed and monitored AGSA findings		
The Human Resources Committee (HRC)			
The HRC reviews and determines the remuneration and	Approved the records management policy		
terms of employment for Mintek, and as part of this process, considers the annual review of remuneration packages based on independent surveys. The HRC also looks into HR policies, internal controls, circumstances, conditions and activities	Approved amendments to the acting allowance policy		
	Approved amendments to the employee development policy		
	Approved the 2014/15 FY performance incentive bonus and the 2015/16 FY annual salary increases		
that affect material changes to policies and procedures and	Compiled and implemented a Mintek women indaba action plan		
demands and vested interests of Mintek's stakeholders.	Approved the remuneration review		
	Approved the amendments to the code of conduct and ethics		
	Approved the amendments to the retrenchment policy		
	 Discussed and monitored reports on employee relations, staff appointments and terminations, employee wellness, employment equity and human capital development 		
The Technical Committee (TC)			
The TC assists the Board in discharging its duties relating to the	Discussed and gave leadership with regards to Mintek strategic partnerships		
legal mandate of Mintek regarding its core business. It provides	Noted international trips undertaken during the financial year		
a forum for discussing technical issues for consideration by the board in informing strategy development and implementation in	Approved all planned international visits for 2016/17		
Mintek. Furthermore, the TC advises on utilisation of expertise, project proposals and financing thereof. looking into various co-	 Led discussions and reviewed intellectual property management, MTEF projects, corporate SHEQ activities and safety statistics 		
operatives and related strategies and the possible expansion of Mintek business within the said mandate.	Considered and reviewed the scorecard for all the technical divisions		

BOARD AND COMMITTEE MEETING ATTENDANCE

Name of Director / Executive member	Scheduled					
	Board	ARC	HRC	TC	Ad hoc	Teleconferences
Total number of meetings	4	3	4	2	1	1
Adv. Linda Makatini	4	n/a	n/a	n/a	1	1
Abiel Mngomezulu	4	3	3	2	1	1
Adv. Derick Block	3	n/a	4	2	1	1
Khomotso Mthimunye	3	3	n/a	n/a	0	0
Imraan Patel	1	n/a	n/a	1	0	0
Dr Vuyelwa Toni Penxa	4	n/a	4	n/a	1	1
Dr Chris Nhlapo	3	n/a	n/a	2	0	0
Nompumelelo Zikalala	3	3 1 2		n/a	1	1
Cathy Leso	0	1	n/a	n/a	0	0
Sakhi Simelane	4	3	n/a	n/a	n/a	1
Gugulethu Nyanda	4	3	4	n/a	n/a	1
Peter Craven	4	3	n/a	1	n/a	n/a
Makhapa Makhafola	3	n/a	n/a	2	n/a	n/a
Alan McKenzie	4	n/a	n/a	2	n/a	n/a
Mpoti Moalusi	n/a	2	n/a	n/a	n/a	n/a
Tumi Hlongwane	n/a	2	n/a	n/a	n/a	n/a

INTERNAL AUDIT

Mintek has established an in-house internal audit function in terms of section 51(a)(ii) of the PFMA Act No. 1 of 1999 as amended. Mintek's Internal Audit (IA) is governed in terms of the Standards for the Professional Practice of Internal Auditing (SPPIA) as prescribed by the Institute of Internal Auditors. The Head of Internal Audit reports directly to the CEO administratively and to the ARC functionally.

Mintek's internal audit function is an independent, objective assurance and consulting activity designed to add value and improve Mintek's operations. It helps Mintek accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of governance, risk management and control processes. The ARC approves the charter, audit plan and budget of internal audit to ensure it operates independently of management. The internal audit function has direct access to the ARC and regular meetings are held with the chairperson of the ARC. Comprehensive reports on internal audit findings are presented to the executive committee and the ARC quarterly. Follow-up audits are conducted in areas where major internal control weaknesses are found.

The internal audit function has been requested by executive management to conduct more

Information Technology (IT) audits with a view to ensure that internal control deficiencies are detected and corrected. This is against the backdrop of the number of findings raised by the Auditor General South Africa in respect of its IT audit. The 2016/2017 internal audit plan includes a number of audits to be executed in the IT area.

INTERNAL CONTROL

Mintek maintains internal controls and systems, designed to provide reasonable assurance regarding the integrity and reliability of its financial statements, to safeguard, verify and maintain the accountability of assets, and to comply with applicable laws and regulations. The directors are ultimately responsible for the company's system of internal control, designed to identify, evaluate, manage and provide reasonable assurance against material misstatement and loss. The effectiveness of these controls is monitored by the internal auditors, who report to the ARC frequently. The ARC requested management to review and evaluate Mintek's existing internal controls to further identify areas that can continually be improved upon. The Board considered reports on controls from internal audit, the external auditor and the compliance and risk management units.

For the period 1 April 2015 to 31 March 2016, nothing came to the attention of internal audit



to suggest that, as a whole, the internal controls of Mintek are inadequate or ineffective. Thus, internal audit is of the opinion that, overall, the internal controls including financial controls of Mintek are adequate and effective.

RISK MANAGEMENT

The Board, with the assistance from the ARC and the Risk Steering Committee (RSC), is responsible for the governance of risk by ensuring that management maintains a sound system of risk management and internal controls to safeguard Mintek's assets, and determines the extent and nature of the significant risks which the Board is willing to take in achieving Mintek's strategic objectives.

The Risk Steering Committee (RSC) is a management committee that continually reviews the risk management process, internal controls, and significant risks facing the organisation and reports to ARC. The RSC provides the ARC with a risk assessment report at appropriately scheduled intervals. Meetings are held on a quarterly basis or as required. The risk management

process includes numerous opportunities for rigorous debate to assess and evaluate the significance of each risk, which is a combination of impact multiplied by probability. The assessment of the potential impact of Mintek's risks and their associated probabilities are determined by the members of Mintek's RSC. The assessment process is designed to be as objective and quantitative as possible, but still contains a degree of judgement. Some risks will be connected to, or dependent upon, other risks. The RSC then considers the different ways that Mintek can respond to these risks, and the responses will be recorded in Mintek's Risk Implementation Plan. The options for responses include avoidance, mitigation, transference, exploitation, termination and integration. This process allows the RSC to update, as required, Mintek's risk plan, risk management strategy and risk management policy. Mintek utilises the services of insurance brokers on an annual basis to analyse and assess the risks associated with its assets, which are insured, together with public liability and professional indemnity, for the risk assessed.

ATTENDANCE AT CORPORATE RISK STEERING COMMITTEE

Name Position		Possible meetings	Attended
P Craven (Chair)	GM: Business Development	4	4
A Mngomezulu	President & CEO	4	3
A McKenzie	GM: Technology	4	4
M Makhafola	GM: Research & Development	4	2
S Simelane	S Simelane GM: Finance		4
G Nyanda Acting Chief Operating Officer		4	4
S Bopape* GM: Corporate Services		1	1
M Mathose	M Mathose Head: Internal Audit		2
H Pretorius Manager: Finance		4	2
P Gibbons Manager: Human Resources		4	4
H Venter	H Venter Head: Information Technology Services		4
M Ginindza	M Ginindza Head: SHEQ		4
0 Mutloane	0 Mutloane Manager: Engineering & Maintenance Services		4
G Ndebele	G Ndebele Head: Campus Support (Security)		2

*Resigned from Mintek on 16 July 2015

FRAUD PREVENTION

Mintek is committed to a high standard of ethical conduct and adopts a zero tolerance approach to fraud. Mintek has adopted a fraud prevention plan that incorporates principles contained in the Public Sector Anti-Corruption Strategy and aligned to the Protected Disclosure Act, 2000 (Act 26 of 2000) and seeks to focus particularly on creating awareness and promoting ethical business conduct. The Fraud Prevention Committee consists of standing members with roles in finance, security and employee relations. The committee also includes a chairperson who is normally a divisional manager, appointed by the CEO on recommendation by Mintek's executive committee. In addition, the CEO forms part of the committee and the Head of Internal Audit serves as an advisor. The committee ensures that cases of fraud, corruption and theft reported through various channels are investigated. It also monitors progress of investigations and ensures that recommendations made by investigators are implemented by responsible people. Mintek ensures that there is a service for all stakeholders to report anonymously any unethical behaviour. This includes reports of suspected fraud, corruption, dishonest practices or other similar matters. The service is run totally independently of Mintek and all anonymous disclosures are accepted and anonymity honoured.

CODE OF CONDUCT AND BUSINESS ETHICS

Mintek's Code of Conduct and Business Ethics (the Code) serves to ensure a consistent and fair approach to ethics and management of conduct by advising employees on the required standard of conduct and behaviour in the workplace. This Code clarifies Mintek's expectations of its employees' conduct and behaviour at all times in line with Mintek policies and procedures.

The Code's guiding principles include:

- Conduct of Mintek's business with honesty and integrity by all employees and contractors.
- Display of acceptable and/or satisfactory behaviour of employees at all times.
- Voluntary compliance with all applicable laws and good business ethics practices.
- Fair dealings for mutual benefit in Mintek's relationships with customers, partners, contractors, suppliers and other stakeholders.
- Commitment of employees to adhere to the principles in this Code.

Mintek Executive Management is responsible for ensuring that this Code is enforced and adhered to by all employees and will investigate in the appropriate manner any breach of the Code irrespective of the seniority of the offenders. It is therefore obligatory for employees to report all actual or suspected contraventions of any section of this Code of Conduct to their immediate Superiors.

MANAGEMENT

Mintek is managed by a President/Chief Executive Officer assisted by five General Managers. This team, in addition to the internal auditor, makes up Mintek's Executive Management Committee which meets on a weekly basis to review strategic and operational issues. This meeting is chaired by the Chief Executive Officer, who is responsible for the execution of the company's strategy and reports to the Board. Executive management is supported by fourteen formally appointed divisional managers who are in charge of Mintek's operating divisions and centralised support functions.

OPERATIONAL PERFORMANCE

Mintek reports to the Department of Mineral Resources (DMR) and is also accountable to the Department of Science and Technology (DST) for its technology-related R&D activities. Various key performance indicators (KPIs), encompassing financial, organisational, innovation and learning, human resources and transformation perspectives, provide Mintek with a basis for evaluating its activities in the identified key performance areas.

Each KPI is supported by a set of identified measures, that provides a more specific and consistent base from which to assess progress.

Mintek's Management Committee convenes on a monthly basis where business plans, financial results and policy updates are presented. The budget for the current year is usually reviewed in September by executive management in order to keep track of and ensure overall sound financial management.

GOING CONCERN

The Mintek Board reviewed the Entity's financial budgets for the period 01 April 2016 to 31 March 2017 and is satisfied that adequate resources exist to continue business for the foreseeable future.

SAFETY, HEALTH, ENVIRONMENT AND QUALITY (SHEQ)

The Safety, Health, Environment and Quality (SHEQ) committee is a management committee that oversees the policies relating to safety, health, environment and quality and their implementation across Mintek.

The SHEQ committee reviews operational performance, anticipates potential issues and provides support in setting direction for improvements. A functional safety, health, environment and quality unit provides a coordinated and effective specialist advisory support to the SHEQ committee.

Mintek has been certified by accredited independent external auditors to meet the requirements of safety and health (OHSAS 18001), environmental management (ISO 14001), and quality (ISO 9001). The following SHEQ scores were achieved at the end of the financial year:

- The Lost Time Injury Frequency Rate (LTIFR) started at 0.5 in April 2015 and ended on 0.3 at the end of the financial year against a target of 1.0.
- The Health Incident Frequency Rate (HIFR) started on 0.1 and ended the year on 0, well below the target of 1.0.
- There were no major environmental incidents reported during the financial year, resulting in the Environmental Incident Frequency Rate (EIFR) remaining at 0 throughout.
- The External Client Satisfaction Frequency Rate (CSFR) varied between 96% and 98% during the year, ending on 97% and always above the target of 90%.
- The Internal Client Satisfaction Frequency Rate (CSFR) varied between 86% and 100% during the year for the various service divisions, ending on an average score of 92% for Mintek, 2% above the target of 90%.



3.5 **REMUNERATION REPORT**

Despite economic and operating difficulties, Mintek strived to retain and motivate its employees using fair, robust and appropriate remuneration and rewards for their respective contributions.

One of the duties of the Human Resources Committee is to ensure that the remuneration policy framework supports Mintek's strategic aims and enables the recruitment, motivation and retention of employees at all levels, while complying with all relevant regulatory and legal requirements.

The members of the HRC for the year under review were:

- Adv D Block (Chairperson and Non-executive Board member)
- Dr V Toni Penxa (Non-executive Board member)
- Ms N Zikalala (Non-executive Board member)
- Mr A Mngomezulu (CEO and Ex-Officio)
- Ms G Nyanda (Executive member GM: Corporate Services)

REMUNERATION POLICY

Mintek's Remuneration Policy promotes the remuneration of employees in a way that reflects the dynamics of the market and the context in which Mintek operates. To this end, Mintek uses market data that is sourced by remuneration specialists to analyse comparator markets and benchmark Mintek's pay scales against those markets. The benchmarking exercise allows Mintek to monitor its pay scales and ensure that they are maintained at levels that are within its budget while also maximising staff retention.

The Remuneration Policy also advances the principles of fairness and equity in pay by promoting internal parity. As a consequence, in the previous financial year, the annual remuneration analysis exercise included an analysis of internal disparity. During the 2013/14 financial year, the study found that there was a need to normalise the pay curve for a small proportion of levels on the job grading system. A process of normalisation was approved by the Board for implementation over a period of three years. The year 2015/16 marked the third year of implementation, and a few employees' salaries were adjusted slightly above the inflation rate to bring towards the salary distribution curve.

In all remuneration reviews, Mintek continually strives to maintain a balance between fair remuneration practices and maintaining a healthy relationship between revenue and total employee costs.

OTHER FINANCIAL BENEFITS

Over and above the direct payments to staff, Mintek has a basket of benefits that are aimed at improving the quality of life of employees at Mintek and improving organisational performance. This basket includes a generous study package comprising of comprehensive bursary scheme that includes transfer payments to academic institutions, purchasing of study materials and books as well as leave provision for attending classes, preparation for exams and consultation with supervisors for Masters' and Doctoral students. Details of Board members and executive management remuneration can be found on pages 103 to 104 of the Annual Financial Statements.







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4 **OPERATIONAL PERFORMANCE**

Mintek continues to focus its R&D activities on commodities with the greatest economic and strategic importance to the country over the long-term. These commodities include platinum group metals, gold, uranium, ferrous minerals, base metals, energy minerals and rare earth elements. Mintek's technical divisions will continue to focus their research themes, as they did in the past financial year around the following:

- Advanced mineralogical analysis and assaying techniques;
- Development of advanced materials;
- Development of energy-efficient technologies;
- Development of water-efficient and water-less processing technologies;
- Enhanced extraction techniques;
- Enhancing the local economic impact of mineral activities;
- Measurement, control and automation;
- Nanotechnology;
- Processing of low-grade and complex ore bodies; and
- Technologies and processes for the low-carbon economy.

During the past financial year, Mintek worked on and completed projects in the the following areas

4.1 ENERGY MINERALS

4.1.1 XRT coal sorting technology

Since acquiring its first ore sorters in the early 2000s, Mintek has undertaken several research and development programmes to help sorting equipment manufacturers, mining houses and engineering project houses improve and optimise the application of sorting technologies. Ore sorting has come a long way since the days when limited computer processing resulted in slow processing speeds. Today ore sorting can be considered a step-change technology in optimising mineral processing plants. The introduction of the X-Ray transmission (XRT) sorter, which tests for imperative atomic density, rather than surface properties, such as colour was a result of the need for a more robust and more accurate sorting technology.

The XRT coal sorting project, conducted as part of the Medium Term Expenditure Framework (MTEF) program, was introduced to demonstrate the successful application of the XRT ore sorting technology. MTEF is a three year funding model used by the South African Government to better control the use of public money. Mintek uses this funding to help with the final phases of IP development, namely prototyping, industrial testing and commercialisation of products and processes. Due to the high mineral resources that are available in the country as well as Mintek's main research areas, the focus of the products and processes is for application in the minerals beneficiation sector, such and mining. Currently, there is a critical need to increase Eskom's coal supply in order to address the energy crisis in South Africa. The quantity and quality of coal required by Eskom are driving factors to meet the country's electricity demand. Mintek is in the process of evaluating XRT ore sorting technology to specifically upgrade coal to a range of high quality products. XRT technology is widely used in the coal industry in destoning (waste rejection) applications. Successful production of high grade coal using XRT technology could benefit the South African coal industry as well as the mining industry in several areas. Advantages include reduction in cut-off grades and expansion of mineable reserves due to the flexibility of blending high grade coal products with lower grade stockpiles.



XRT ore sorting is a dry process which will result in additional water conservation. The project is being conducted in collaboration with African Exploration Mining and Finance Corporation (AEMFC) (SOC) LTD and a demonstration plant will be operational on their minesite during FY 2017.

4.2 BASE METALS

4.2.1 Nickel sulphide bioleach project

In November 2014, Mintek secured a licence agreement with talc producer Mondo Minerals for the application of Mintek's proprietary nickel sulphide bioleach technology at Mondo's Vuonos talc production site in Finland. A by-product of the talc mining operations is a sulphide concentrate that contains valuable quantities of nickel and cobalt, but also contains arsenic, which makes smelting of this material unattractive. Mondo has therefore chosen to apply Mintek's bioleaching process for the recovery of nickel and cobalt from this side stream. The product is a mixed hydroxide precipitate containing nickel and cobalt. An important aspect of the process is that it includes the production of a stable arsenic-bearing waste, suitable for impoundment.

Plant construction was completed during 2015, and hot commissioning of the process began in August 2015. Over the past year, Mintek has overseen the successful on-site build-up of the bacterial inoculum, and provided support and training to Mondo's technical staff during the inoculation and commissioning of the production-scale bioleach plant. Commissioning of the entire plant and performance testing of the bioleach process is expected to be completed in the upcoming year.

This is the world's first commercial-scale implementation of a bioleaching process for treating a nickel sulphide concentrate. At full production, it is expected that the plant will treat approximately 12,000 tonnes of nickel concentrate per annum, producing about 1,000 tonnes of nickel annually.

Mintek anticipates that the successful completion of this project will demonstrate that the biohydrometallurgical treatment of complex base-metal sulphide concentrates is both technically and commercially viable, and that it will pave the way for the development and processing of other nickel sulphide reserves that are currently unexploited because of their arsenic content.

4.2.2 Nicksyn[™]

The Nicksyn[™] reagent developed by Mintek was found to exhibit remarkable characteristics when mixed with Versatic 10 acid. The Nicksyn[™]/ V10 synergistic system enhances the separation of nickel (Ni) and/or cobalt (Co) from calcium (Ca), magnesium (Mg) and required levels of manganese (Mn) in various sulphate solutions. The synergistic mixture is able to

recover Co/Ni selectively from Ca, Mg, and Mn and has previously been tested in pilotscale studies up to definitive feasibility study level for the recovery of nickel from a laterite ore at Çaldağ Nikel in Turkey. Mintek has continued testing the synergistic system for other applications such as the recovery of cobalt from typical DRC/Zambian copper-cobalt leach liquors. The system was also previously successfully demonstrated over 2800 hours on the Tati Nickel Activox demonstration plant in Botswana during 2006. The Nicksyn™/V10 system has proven to be very robust showing easy nickel recovery. Nicksyn™ is commercially available from a reputable, international manufacturer.

4.2.3 Direct Cobalt Electrowinning

The Direct cobalt electrowinning (CoEW) technology was developed by Mintek as an alternative to the Mixed Hydroxide Product (MHP) process, in order to enhance the process economics of the Cu-Co flowsheet by producing a higher quality Co product (97% Co) from the low-grade CuSX raffinate bleed at reduced operating costs. Mintek has conducted extensive CoEW test work and the operating conditions were determined on a full scale industrial sized cathode cell. A techno-economic study was conducted in collaboration with the engineering company DRA to quantify the capital and operating cost estimates of the direct CoEW flowsheet in comparison to the MHP flowsheet. Two different Cu:Co ore ratios of 5:1 and 10:1 at a constant Cu grade of 3% (w/w) were evaluated, and two different power supply sources, i.e. grid versus generator power, were also investigated to take into account the effect of unstable power supply, which is an operational problem for operations in the DRC. The techno-economic evaluation study indicated that the direct CoEW flowsheet has a notable potential benefit when compared to the MHP flowsheet. The expected differential mean net present value for direct CoEW flowsheet could potentially increase by US\$ 100 million compared to the MHP flowsheet. The highest capital calculated for the direct CoEW flowsheet would result in an additional US\$ 42 million expenditure (5:1 Cu:Co ore ratio, generator power). However, when considering the nominal/mean values obtained from the various mass balances conducted, the operating cost savings would result in a potential higher mean net present value of US\$ 74 million.

4.3 FERROUS MINERALS

4.3.1 The Dual-Electrode project

The Dual-Electrode project which successfully concluded during the year included the development of new operating procedures to operate the furnace with a burden instead of an open-bath as commonly practice in a DC furnace. A three week test project demonstrated the feasibility of converting existing industrial furnaces from three-electrode AC mode to DC mode via utilisation of two electrodes, a cathode-anode arrangement, instead of building a new furnace with the anode imbedded in the bottom of the furnace. The Dual-Electrode project is specifically aimed at the manganese industry where throughput is currently restricted due to

Nantechnology Research Laboratories at the Advanced Materials Division showing (a) NanoGold Products (b) Samples in the Tissue Culture Lab





Reactivated carbon discharged from a Minfurn, a continuously operated furnace that processes carbon by resistive heating

the nature of AC furnace smelting, but the concept can be applied to any smelting process to improve efficiencies. The test demonstrated that it is feasible to operate with a burden covering the slag bath utilizing this configuration and evaluation of the results from the test will continue into the next financial year.

4.3.2 PyEarth

PyEarth, is a novel smelting process to concentrate rare earth elements in slag whilst extracting the iron from the ore as a pig iron product. The process was demonstrated at pot scale and includes testing of the downstream hydrometallurgical processing of the slag. The results from the tests were promising and a provisional patent was filed. The PyEarth process can facilitate unlocking resources previously deemed untreatable via normal physical upgrading processes. A pilot plant test is planned to support the patent application.

4.3.3 **BOFLUX**

The Era-Min funded project, BOFLUX, aims to demonstrate potential energy and recovery benefits through small additions of boron containing minerals to ferrochromium smelting processes. Mintek is collaborating with EtiProducts (Finland) and Siyanda Chrome Smelting Company (South Africa) on this project and the test work conducted showed significant potential benefits for low-grade chromite sources. The work supports Mintek's Low-grade Chromite Process (SA Patent 2015/03921). Boron is potentially beneficial for ferrochromium smelting as an additive as benefits include lowering of slag viscosity and slag production (volume), both aspects which can be leveraged to lower energy consumption overall. The provisional laboratory tests completed during the year will be followed by larger pilot-scale tests to confirm the bulk behaviour of this proposed process.

4.3.4 Chrome tailings project

South Africa possesses 34% of economically minable chromium resources. During mining and processing, large amounts of tailings are generated and the chromite tailings are processed to recover Platinum Group Metals (PGM's) and generate revenue thereof. Also, chromite tailings are taken from PGM plants to make ferrochrome. Mintek conducted research into the development of a suitable flowsheet to process chrome tailings.

Gravity and magnetic separation of chromite (Cr_2O_3) from spiral tailings sample from Hernic Ferrochrome (Pty) Ltd Mine located in North West Province was investigated. The objective of the testwork was to assess if chrome can be upgraded to saleable Cr_2O_3 grades of above 40%. Magnetic separation of chromite from the spiral tails improves Cr_2O_3 recoveries up to 80% but at lower Cr_2O_3 grades. The poor grade performance was related to the association of silica with Fe-bearing minerals found in the sample. In contrast, both gravity separation methods used were found to be capable to upgrade chrome from spiral tailings to Cr_2O_3 grades above 40% at low Cr_2O_3 recoveries and mass yield.

4.3.5 National Foundry Technology network towards an alloy developmental R&D project

Mintek's green technologies encompass developing energy efficient processes, flow sheets and control technologies that minimise energy consumption and carbon emissions. The current project falls under the Energy Efficiency cluster of the MTEF funding, and is focused on decreasing the energy usage in the metal casting and foundry industries.

A foundry is a factory that produces castings made from molten metal according to the specifications of an end-user. Foundries are a critical component of South Africa's (SA)



industrial economy as so many industries are dependent on them however the number of firms has shrunk from over 400 at the end of the 1980s to just around 200 currently.

A major way to reduce energy use in the foundry is to reduce incorrect practices being followed. This will improve the quality of the cast product and also reduce the amount of scrapped items in the foundry. This year several local foundries were visited so as to investigate their foundry process and improve the quality of their product. These foundries include: Preform Line Products (PLP), McWade Productions, PDC, Pfisterer and PEFCO.

4.4 TECHNOLOGY METALS

REE extraction pilot plant and the SACREF concept

In June 2015, Mintek launched its Rare Earth Elements (REE) pilot plant facility, showcasing Mintek's capabilities in the processing of REE from a large variety of sources. The extraction plant is based on proven technology and an extensive laboratory test work programme was undertaken by Mintek to develop the solvent extraction process. Features of the facility include PH control, feed and organic flow control, full automation, and a SCADA system to log/record all information. Although designed specifically for separating the REE into light, medium and heavy fractions, the versatile facility is capable of separating the REE into individual elements as well as other solvent extraction based recovery or purification application.

In order to provide a viable processing option with acceptable economies of scale, Mintek has developed the South African Centralized Refinery (SACREF) a concept which is of a centralised processing facility for potential producers in Southern Africa. This would provide South Africa with an opportunity to lead in the production of downstream value-added manufactured REE products and clean environmental technologies. Such a manufacturing capacity could create a large number of skilled "green" jobs and is one of the best opportunities in the minerals sector to support the vision of transforming South Africa from a resource to a knowledge based economy.

4.5 INDUSTRIAL MINERALS

Phosphate beneficiation

Mintek has been involved in several projects addressing process development and flowsheet design of phosphates since 2003. Some current accolades include processing of the Marine and Sedimentary Phosphates on a pilot scale. Mintek has a competitive advantage and experience in the development of beneficiation routes for phosphates originating from both sedimentary and igneous deposits. With over 80% of the world phosphate production derived from sedimentary phosphates, these have been primary reserves for testing. Owing to a well maintained database, Mintek is well positioned and equipped to execute projects on a scoping, prefeasibility feasibility, and bankable level with skilled staff, laboratory and pilot facilities to compliment the services rendered.

This year, Mintek in collaboration with ELB engineering on behalf of Gaya Resources (Israel consultancy specialising in phosphate beneficiation) completed a major phosphate feasibility project. The project involved continuous pilot scrubbing and classification with the prospect of the process option being viable for the treatment of the Lucunga sedimentary deposit in Angola which will be used to produce quality fertilizer product. Additionally, Gaya Resources recently enquired about a Cacata phosphate in the Cabinda area in Angola on behalf of Mongo Tando Pty Ltd, and a detailed proposal to run bulk pilot plant to produce a marketing phosphate concentrate also intended for the fertilizer market has already been issued.

4.6 PRECIOUS METALS

4.6.1 **Projects involving gold recovery**

Mintek Successfully completed the large pilot plant campaign, recovering gold from waste material. In total, 2500 tons of waste material was processed over a 6 month period with more than 90% recovery of gold from difficult-to-treat materials. A project highlight for the client was the recovery of over 1000 kg of gold from this difficult to treat materials. The gold was recovered and returned to the client contained in a copper alloy which is currently being processed at the client's facilities. The project was a commercial success for all parties involved and due to the relatively uncommon chemistry involved in processing the waste materials, several new research topics were identified during the execution of the contract.

Gold Fields Ltd requested Mintek to carry out metallurgical amenability test work comparing the gold recovery from three different samples (ROM, Leach Feed and Final Residue) at two free sodium cyanide dosages (250 mg/L and 400 mg/L) on samples from the South Deep plant. The scope of work included sample preparation, gold head analysis, size by-assay analysis as well as cyanidation at 250 mg/L and 400 mg/L cyanide. The results indicated that the ROM sample had the highest average head gold grade of 4.73 g/t followed by the Leach Feed sample with an average head gold grade of 4.00 g/t. The final residue sample had the lowest average head gold grade of 0.22 g/t which indicated that the plant achieved gold recoveries of about 94.5% gold (comparing the Leach Feed and Final Residue gold concentrations).

The leach results indicated that the gold recoveries from all three different samples yielded similar results for both concentrations of cyanide (250 mg/L and 400 mg/L) tested. Further leaching of the Final Residue sample indicated that an additional 20 - 30% gold could be recovered and that the remaining gold in the residue is associated with the coarser +106 µm fraction which could probably be liberated by grinding the sample finer. However the viability of finer grinding will have to be investigated to establish if the associated cost can be offset by the additional gold recovery.

4.6.2 Minfurn project

Minfurn is a new generation furnace used for regeneration of activated carbon using Direct Resistive Heating. With every adsorption cycle in the process, the activated carbon loses its adsorption ability due to contamination by organics. Thermal regeneration decomposes the organic matter and restores the original activity of carbon. Minfurn offers several advantages over conventional carbon regeneration equipment viz. continuous operation, efficient energy utilization, lower maintenance costs, refractory walls that resist high temperature and corrosion. Also, owing to its small size, simplicity in operation and energy efficiency, the Minfurn is economical to construct and efficient to operate. Minfurn (125 kg/h throughput) development work continues as the gold industry's focus on optimising and cost reduction continues to offer opportunities for Minfurn installations in Southern Africa. Gold enquiries relating to Minfurn increased significantly over the latter part of the year with several enquiries for Minfurn installations received from Zimbabwe, where the latest installation of a Minfurn unit was commissioned in March 2016 at Venice Mines. Marketing efforts in the rest of Africa are currently focused on Zimbabwe and the lvory Coast, where several mine sites already utilise a Minfurn. Mintek has received several enquiries for a small-scale Minfurn (3 kg/h throughput) from smaller gold mines and is currently working on finalising a commercial design at this scale.



4.6.3 Treatment of Gold and Uranium

Mintek was contracted by Sibanye Gold to generate new data for work being carried out under West Rand Tailings Retreatment Project. Sibanye Gold is evaluating its surface tailings dam resources for gold and uranium recovery while at the same time addressing any future environmental liabilities. Sibanye has approximately 20 tailings dams and a prefeasibility study on Driefontein Dams 3 and 5 showed that these dams could be economically processed. However, a subsequent technical review revealed that additional data on the different processing options would be required to complete a bankable feasibility study. Mintek designed a test work programme which was divided into 2 phases to determine the most suitable flowsheet design. Using the optimal flowsheet for both dams allowed for 60% of the gold recovered in \sim 20% mass while generating flotation tailings which comply with environmental targets of <0.3% sulphide and <40 g/t uranium.

4.6.4 Advancing gold processing

Mintek is attempting to advance gold processing amid the weak market to reduce the cost involved in extracting the yellow metal and aid struggling mining companies. The gold industry has been using the same processing methods for decades, with very little developments taking place. New methods introduced by Mintek are more efficient and save mine companies time and money.

One of Mintek's processing developments involve improving the efficiency of gold plant parameters, such as the operation of gold recovery circuits using information from Mintek's advanced leach facility (ALF). The ALF facility which has been servicing commercial projects since being commissioned in 2009 aims to provide an understanding of the leach chemistry of a specific sample so as to assist in advancing selected plant operating conditions. The ALF laboratory can perform five automated leach tests simultaneously, with online analysis of cyanide (including cyanide speciation) and dissolved oxygen, as well as the simultaneous measurement of pH levels, reduction-oxidation, temperature and conductivity. The ALF can be used to determine the best time of mining operations, reagent consumption, minimum environmental impact and gold recovery in relation to other parameters such as oxygen consumption.

Over the last few years, Mintek has developed a gold process advisor (AuSimPro) system, prompted by, expansion of existing mines, reclamation of dumps and processing of complex and refractory low-grade orebodies. Many South African gold projects are experiencing time and budget constraints, which necessitate focused development and testwork programmes to provide the relevant information to compare available processing options and economic trade-offs. The AuSimPro system is a growing database which incorporates Mintek's knowledge on previous and current projects, including information on gold grades, site location, mineralogical information on the ore and the occurrence of gold, gold recovery rates and the treatment steps applied.

The Advanced Leach Facility (ALF) for gold processing at the Hydrometallurgy division





Pressure oxidation involves the oxidation of sulphides by oxygen at elevated temperature and pressures. In recent years there has been an increasing interest in this technology especially with regards to the processing of refractory gold ores which requires oxidation prior to gold recovery. Mintek has thus expanded its Pressure Oxidative (POX) leaching facilities which now includes three batch autoclave vessels and a continuous autoclave pilot plant. Modelling and simulation of pressure leach circuits is a valuable tool in identifying optimal operating conditions and evaluating plant performance.

4.7 ECO EFFICIENCY AND ENVIRONMENTAL PROTECTION

4.7.1 Mine Effluent projects

Over the years, Mintek has developed a number of technologies that could potentially be used to treat mine effluent. By providing technologies for the prevention and remediation of pollution caused by mine effluent, the sustainability of the mining industry is ensured while also protecting the inhabitants of the impacted environments, as well as the national heritage sites and other natural resources in the proximity of mining activities. Over the last year, the Mine Effluent Treatment projects focussed on two main objectives viz. secure a suitably polluted site and thereafter identify relevant technologies to be used in the remediation of the identified site. Robinson Lake in Randfontein was selected as a suitable site to demonstrate Mintek technologies. A conceptual flow sheet was developed to determine the most appropriate technologies to be used in the remediation process. The Mintek technologies that were identified include: SAVMIN™, MetRIX™ (resin in pulp), NIMCIX, biological sulphate reduction, silicate encapsulation, biological oxidation and ion exchange membrane and bead technology.

4.7.2 Urban Mining projects

Due to the high cost of primary gold mining in South Africa and the prime real estate occupied by dump sites, reprocessing to recover economic value from minerals and land has generated much interest in the last number of years. Consequently, Mintek has been actively involved in tailings reclamation projects for the last 5 years. Additionally, there is also a growing awareness that there is a potential of realising additional benefits such as minimising problems related to pollution, health and safety such as dust (which is sometimes radioactive) and acid mine drainage potential merely by processing the dumps intelligently.

Mintek is proceeding using the principles of sustainable development by ensuring the holistic treatment of dumps, this includes recovering all components of value and simultaneously ensuring that the acid mine drainage and other environmental legacies are addressed in order to ensure that once the dumps are treated, there are no residual economic components remaining and the environmental legacies is addressed in its entirety.

In order to facilitate the exploitation of this secondary mineral resource, Mintek has undertaken a thorough characterisation study of these dumps to provide guidance for new dump projects over a wide range of scenarios. This study involved the collection of multiple samples from the East Rand, Central Gauteng, West Rand and Free State dumps and evaluating them with respect to metallurgical processing amenability and environmental impact. The outcome was then related to a number of possible scenarios covering not only processing options, but also specific



Left and below: Images of rehabilitation programmes managed by Mintek on behalf of the Department of Mineral Resources





project characteristics to provide tailored decision support to new projects. Since the typical flowsheets currently used for dump retreatment do not necessarily result in responsible final processed tailings material with low acid mine drainage potential or low radioactivity, such a process advisor may reduce future legacy costs in the country by highlighting to operators the impacts of the different processing options not only on profitability or the environment, but also on their potential liability.

Mintek has completed a direct hydrometallurgical pilot plant to recover copper from printed circuit boards (PCB) to produce copper cathodes. The research programme began earlier in 2014 and is conducted as part of the Urban Mining project which seeks to investigate practical solutions for the recycling of metals derived from electronic waste (e-Waste) for sustainable development. Electronic waste originates from discarded electrical and electronic devices such as mobile phones, computers, microwave ovens, television sets, etc. E-waste contains certain valuable metals such as copper, gold and some platinum group metals which can be recycled.

An increased demand for electronic devices in Africa has consequently resulted in an increase in the amount of E-waste generated. E-waste can cause environmental problems if it is not stored safely. Even incineration of such materials can result in toxic gases being released into the atmosphere, and it is therefore important that E-waste is recycled in an environmentallyfriendly manner.

The recovery process includes milling and leaching of a PCB sample in a sulphuric acid medium with an oxidant. The resultant pregnant leach solution produced from the bulk leaches contained a high concentration of copper in solution which was further purified in a continuous pilot plant. An organic extractant was used to extract copper selectively and the spent electrolyte produced from the electrowinning circuit was used to strip the copper from the organic phase. The purified solution produced via solvent extraction was then passed onto an electrowinning circuit, whereby copper cathodes were produced. The production of copper cathodes from e-waste has showcased Mintek's ability to produce a saleable product from e-waste, and in so doing contributing to sustainable development for South Africa and the rest of African countries.

4.7.3 SAVMIN™ project

The SAVMIN[™] process was developed by Mintek for the removal of pollutants from acid mine drainage. The main feature of the SAVMIN[™] process is the removal of sulphates from gypsum-saturated water using aluminium hydroxide to precipitate the highly insoluble compound, ettringite. Through the years, Mintek had performed extensive work to optimise the process flowsheet of the SAVMIN[™] process. Recent developments resulted in Mintek entering into a partnership agreement with Veolia Water Solutions and Technologies (Veolia), with the objective of achieving a highly competitive process for the treatment of acid mine drainage. This year, a SAVMIN[™] pilot plant was constructed and installed in the vicinity of the Sibanye Gold Water Treatment Plant in Randfontein, Johannesburg. The aim is to successfully demonstrate the SAVMIN[™] process and to obtain process parameters to be used for a techno-economic study of the SAVMIN[™] process.





Left: SAVMIN™ pilot plant for the treatment of acid mine drainage Below: Nano fibres fabricated in the Nanotechnology Innovation Centre (NIC) for use in Water Purification.

4.7.4 Mine site rehabilitation

Mintek is managing a programme of derelict and ownerless mine site rehabilitation under contract to the Department of Mineral Resources. The programme, which focuses for the moment on old asbestos mine sites, made significant progress over the last financial year, including the rehabilitation of the Betle, Sithilo, Ga-Madiba and Mang-le-mang sites. Also, designs and/or option reviews for the Streatham, Bosrand and Heuningvlei sites were completed in the year.

4.8 ADVANCED METAL APPLICATIONS

4.8.1 Nanoscience and nanotechnology projects

Nanotechnology is a developing applied science with tremendous potential to create new and innovative consumer and industrial products, and processes or enhance the performance of existing ones across sectors. The Nanotechnology Innovation Centre (NIC) at Mintek established by the DST focuses on addressing national priorities in a range of domains including water, health, agriculture and environment. The DST/Mintek NIC comprising four research units viz. nanominerals, sensors, water, and biolabels has made significant contributions in these areas over the last year.

Nanominerals Unit is in the interdisciplinary field of nanoscience and nanotechnology, with an emphasis on the fabrication of mineral-based nanomaterials and development of nanodevices for electronic, biomedical and water applications. The research covers (i) the growth of nanomaterials with tailored properties, (ii) device fabrication and characterization, and (iii) applications development to facilitate scientific breakthroughs. These projects are in close collaboration with the other NIC development units viz. sensor, water and biolabels.

The Sensor Unit seeks to develop and commercialise sensors that are easy to use, reliable and robust in that it would be usable in remote areas with minimal technical skills needed for operations. The sensor technology is relevant to human, animal and environmental health. In human health the key focus is on communicable diseases as well as other diseases that are prevalent in Africa and South Africa. In animal health the focus is on zoonotic diseases and in environmental health the focus is on water pollutants especially pollutants in waste water such as trace metals and other pollutants depending on the water source. The unit has also developed and branded novel screen printed electrodes (SPEs), NICSens.

The Water Unit focuses on the integration of nanotechnology into membrane and adsorbent technologies, by undertaking research and development in novel membrane materials and adsorbent composites for water treatment and wastewater remediation. This is partly to address current challenges encountered using these technologies but also to increase the overall efficiency of water/wastewater treatment/remediation processes. New polymeric membrane formulations and adsorbent composites, containing specific functional groups and nanoparticles, were developed in-house and both, the membranes and adsorbents showed improved pollutant removal characteristics compared to commercial counterparts.

The membranes also showed excellent results on real water samples i.e. Emalahleni coal mine decant water, urban wastewaters, and Mintek industrial effluent.







The Biolabels Unit under the Nanotechnology and Nanoscience Group at AMD seeks a collaborative effort in addressing health issues using nanotechnology-based tools. The Unit's goal is to develop high performance bio-molecular functionalized nanostructures which are then used for point-of-care diagnostics The Unit focused on the development of point-of-care rapid diagnostic test. During this FY period, the Unit focused on marketing its products and fostering partnerships with industry in ensuring they get closer to commercialization.

The Unit has signed a distribution agreement with a medical device company, Afri-sky Holding, for marketing and distribution of their HIV and Malaria rapid diagnostic tests (under the trademark MinDiagnostics®) in the Southern African Development Community (SADC). This agreement marks the beginning of the commercialization of the Mintek rapid diagnostic tests which will be manufactured in the state of the art cleanroom. The Biolabels Unit is in the process of obtaining ISO 13485 quality management standard for the rapid diagnostic tests.

4.8.2 HySA/ Catalysis programme projects

Hydrogen South Africa (HySA) is a National Hydrogen and Fuel Cells Technologies Flagship project aimed at establishing South Africa as one of the few nations that export high-value products into the growing international hydrogen and fuel cells markets. HySA/Catalysis, co-hosted by the University of Cape Town and Mintek, is one of three Centres of Competence tasked with the establishment of a technical and scientific base for distinctly South African contributions to the global hydrogen and fuel cell technology know-how.

Mintek signed an agreement with Impala Platinum to Ioan Pt-metal to HySA/Catalysis for the purpose of accelerating R&D progress in fuel cell research. Trial runs of the catalysts pilot plant with carbon only, have been successful and scale up project is underway. HySA/Catalysis is also involved in a Technology Innovation Agency (TIA)-funded project with with a company called Telco. Project investigations are on-going but results to date have shown a significant improvement in hydrogen-only fuelled HySA membrane electrode assemblies.

4.8.3 AMI-PMDN programme

Under the AMI-PMDN programme, a distribution agreement for the DST/AMI-PMDN developed catalysts has been signed with PGM Bentech, a local SMME company. Negotiations are underway with their PGM-producer partner to provide the palladium (Pd) needed to prepare the first series of test kits needed to market the catalysts. In technical work in the AMI-PMDN, a further ten platinum-based catalysts are under development for potential commercialization through the PGM Bentech agreement.

4.9 SMALL BUSINESS DEVELOPMENT

4.9.1 Research in small scale mining

In the 2014/15 financial year the Small Scale Mining and Beneficiation (SSMB) Division developed a filter using sand, clay and activated carbon for purifying contaminated water resources. This received an APEX award. During 2015/16 training was conducted in the villages of Dzingidzingi and Letsitele in Limpopo where 21 people were taught on how to use this water filtration system and also the process involved in purifying water for drinking and food preparation. The training was well received and fully supported by the community ward councillors.

SSMB embarked on a project to develop a low cost feldspar-based ceramic glaze for utilisation by new or existing small scale ceramic groups. Test-work conducted indicated that ceramic glazes can be manufactured using simple method of mixing crushed and milled raw materials together using different ratios and adding water to the mixture. Various colours such as tan, tenmoku, celadon, goldish brown and pink glazes were developed using colour additives minerals such as tin oxide, rutile and iron oxide.

SSMB successfully developed a process flowsheet for a 40 ton/hour mobile plant for the recovery of chrome from chrome tailings dumps in the Bojanala Region, North West province. Research and testwork conducted on actual tailings samples resulted in the development of an affordable gravity separation-based flowsheet that would be suitable for small scale miners. The developed process flowsheet was designed to handle smaller particle sizes efficiently and involved minimal capital requirements, which is key for small scale operators.

4.9.2 Training and development

Two training and beneficiation centres were set-up and launched during the 2014/15 financial year in Prieska and Upington as part of the MTEF funded Northern Cape Gemstone project. Mintek has continued to provide technical and production assistance to the two centres with a focus on market access and sale of products. 21 learners were trained on the grading of semi-precious gemstones (especially tigers eye) using simple techniques. This is to ensure that the centres use the best grades of raw material for production. An MoU between Mintek and the Northern Cape Department of Economic Development and Tourism has been entered into which will see the centres in the province receive continued support even after the MTEF project funding is depleted.

The Eastern Cape Province is amongst the impoverished provinces in South Africa. According to Statistics SA, over 70 per cent of those residing in the province live below the poverty



Far right: Hand crafted glass beads and jewellery manufactured through training and development projects at Small Scale Mining & Beneficiation (SSMB).

Mintek's FloatStar Level Stabiliser technology has been implemented on flotation circuits around the world



line. The study confirmed that there are numerous mining and beneficiation opportunities in province. The minerals identified to have potential for small scale operations are kaolin, limestone, general clay, dolerite, sand and gravel, sandstone and coal. 54 learners were then trained in an Introductory Course in Small Scale Mining in Umtata, Eastern Cape. These learners are aspirant miners who want to exploit the various local small scale mineral deposits.

The Gauteng Department of Sport, Arts, Culture and Recreation last financial year continued their collaboration with Mintek by extending their current Glass Beads programme to now also include Glass Slumping. The training of 10 learners in this technique was completed during this quarter in the Sharpeville area. Africa Foundation is an independent, non-profit organisation in South Africa whose purpose is to uplift, up-skill and empower rural communities primarily living adjacent to conservation areas. Mintek received funding for the set-up of a glass beads manufacturing project in Bushbuckridge, Mpumalanga Province that will create employment for 10 people within the local community.

4.10 PROCESS MONITORING AND CONTROL

4.10.1 MillStar control systems

The MillStar suite of controllers is a software-based control system. It has existed in its current form for over 10 years and Mintek has been involved in automatic control of flotation circuits for approximately 30 years. The most recent commissioning of the MillStar stabilisation control system was at Tharisa Minerals. The system was commissioned under the configuration involving a recycle of the Thickener Underflow stream to a Booster Cyclone as opposed to this stream going directly to the Surge Tank. The underflow of this cyclone is fed to the Secondary Mill Discharge sump. The objectives of the MillStar commissioning were to stabilise both the Secondary Mill discharge and Primary Thickener sections of the plant with an overall aim of stabilising and controlling the Surge Tank section, in particular the Rougher feed flowrate and Rougher feed density. This was successfully achieved during the process. A significant improvement in density control to the flotation plant was achieved under MillStar control when compared to the plant control. This was achieved with minimal variability being introduced in the Rougher feed flowrate.

4.10.2 FloatStar control systems

Previously, Mintek commissioned the Floatstar Advanced control system at Lundin's Eagle Mine Humboldt Mill in Michigan, USA. Last year, a follow up visit covered the commissioning of the Regrind Mill Discharge controller since the Regrind Mill was re-commissioned after the initial commissioning trip. The follow-up visit also included control philosophy changes (requested by the plant), additional training of operators on the use of the FloatStar system and fine tuning of the control system. Analysis of the results indicates that the FloatStar control system has improved the overall control of the plant.

In addition to installing the Millstar Control system, Tharisa Minerals also requested Mintek to install and commission the FloatStar Level Stabiliser control system on their floation circuit to help achieve stable level control. The commissioning was carried out over two site visits where, the first visit (in December 2015) involved the installation and Site Acceptance Tests (SAT). The second visit was the actual commissioning phase which was completed in February 2016. Results showed that overall, Floatstar provided better level control compared to the programmable controller.

4.10.3 Real-time optimizer

A prototype of Mintek's Real-Time Optimiser (RTO) control system was demonstrated at Pilanesburg Platinum concentrator plant. A typical control system responds to the short-term dynamic disturbances in the plant, and tries to keep the process as close to the operator specified setpoints as possible. The challenge is that often it is impossible to meet all the specified setpoints at the same time because of the physical interactive nature of the process circuit. For instance, a control system cannot keep a tank from overflowing if it is controlling the flow into the tank to an operator–specified setpoint that is higher than the maximum outflow from the same tank. Eventually the tank will overflow. The Real-Time Optimiser takes over these locally specified setpoints and operates the whole circuit in a way that best achieves the overall objective of the section of the plant. In the case of the Pilanesburg demonstration, the RTO was set up to control the discharge end of the milling circuit, with the ultimate objective of achieving a stable output flowrate to the downstream flotation plant at stable density. The RTO dramatically improved both the stability of both the flow and density to the flotation circuit, and at the same time the usage of the control system improved from 96% to 98.5%.

4.10.4 The Lab Cynoprobe

The Lab Cynoprobe was developed several years ago to broaden the impact of Mintek's cyanide measurement technology, and facilitate the use and evaluation of this amperometric technique within a Client's own laboratory to assist with International Cyanide Management Code (ICMC) compliance and to evaluate the measurement principle for wider online implementation of the Cynoprobe v3 as part of a broader ICMC compliance strategy. Mintek has sold over 15 of these units in recent years, and has seen increased requests from industry for the instrument. The present version of the Lab Cynoprobe unit is ultimately a simplified



Measurement and Control division's Cynoprobe which offers the functionality to measure both 'free' and weak acid dissociable cyanide concentration.

version of the Cynoprobe 3 instrument. The drawback of the existing Lab Cynoprobe unit is the high cost associated with manufacturing the instrument. As a consequence, a project was initiated to develop a portable Handheld Cynoprobe unit, which is based on the embedded technology developed for Mintek's Low Cost Cynoprobe instrument, to replace the expensive Lab Cynoprobe. Recently, battery operated prototype of the hand-held unit was tested and shown to produce excellent results.

4.11 COLLABORATIONS AND SCIENCE PROMOTION

Mintek attended the International Basic Research Infrastructure Meeting in November 2015 at the Embassy of Italy in Washington, D.C. The purpose of the event was to explore basic science partnerships by leveraging international investments in global research infrastructure. International participants included the National Research Council of Italy, Italian Aerospace Research Centre, Australian National Fabrication Facility, Commonwealth Scientific and Industrial Research Organization, and Mintek, South Africa. US participants from the American Association for the Advancement of Science, NASA Glenn Research Center, Naval Research Laboratory, Army Research Laboratory and Air Force Research Laboratory were in attendance. There was also representation from Texas A&M University, Johns Hopkins University, and Virginia Tech University. Earlier this year, Mintek and Virginia Tech University submitted a Partnership for Enhanced Engagement in Research (PEER) funding proposal.

Mintek and Kingsmead Investment (Pty) Ltd signed a Memorandum of Understanding which aims to strengthen the working collaboration with the Southern African Development Community (SADC) region at a meeting held in Botswana on 15 March 2016. The agreement pertains to the establishment of a low volume grinding media casting facility in Kingsmead Investment, suitable for the production of up to 400 tons per month of high chrome steel grinding balls. Kingsmead Investments (Pty) Ltd, is a foundry based in Botswana and supplies cast iron products to the manufacturing companies and quarries in Botswana. There is a strong drive from the Botswana government to reduce export of steel scrap. The focus is to increase localisation, skills development, improve local production services and job creation.

On 08 March 2016, Mintek and Kimberly Diamond and Jewellery Incubator (KDJI) signed a Memorandum of Understanding to enhance cooperation in skills development and transfer, incubation, and market access related to jewellery design and manufacturing. KDJI is a non-profit organisation which offers mentoring, training and support to aspiring diamond cutters, polishers and jewellery manufacturers with the requisite skills to succeed in the industry. KDJI



Top Right: Diagnostic test kits and MinPeptides developed at the Nanotechnology Innovation Centre (NIC). Below: ELISA tests conducted in the Tissue Culture Lab.



also offers newly registered and existing SMMEs access to facilities, infrastructure, business skills, enterprise mentoring and coaching, and facilitation of linkages to markets.

At the DST/Mintek Nanotechnology Innovation Centre, the Biolabels Unit concluded a distribution agreement with AfriSky (Pty) Ltd, a South African SMME. Under this partnership, AfriSky will serve as a distributor of rapid diagnostic kits produced by Mintek.

A training programme for the International Atomic Energy Agency (IAEA) Fellowship was hosted at Mintek from 11 January – 04 February 2016. Participants included researchers from the Egypt Nuclear Authority and the Philippine Nuclear Research Institute. The programme was offered in collaboration with the Department of Energy, and the Permanent Mission of South Africa to IAEA, Vienna. The programme is designed to provide training in analytical techniques for uranium, rare earths and other trace elements in the phosphates as well as solvent / iron exchange extraction of uranium and rare earths.

A MoU between Mintek and the Northern Cape Department of Economic Development and Tourism has been entered into which will see the centres in the province receive continued support even after the MTEF Northern Cape Gemstone Project is complete. Currently, training at the Upington Centre has been completed but Mintek continue to provide technical and production assistance to the centres with a focus on market access and sale of products.

Mintek has been a strong, consistent participant in European Union collaborative research activities. Mintek remains the only non-EU member of the European Technology Platform for Sustainable Mineral Resources, which assists in formulating policy and research direction for the EU minerals industry. Mintek is also one of the leading South African participants in the EC Horizon 2020 programme, currently partnering in 6 projects.



OPERATIONAL PERFORMANCE







5. SUSTAINABLE DEVELOPMENT

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From left to right: a) Delegates at the Women in Mintek Indaba held at Mintek; b) Buyisiwe Nhlengetwa, c) Honourable Minister Susan Shabangu, Minister in the Presidency responsible for Women (centre), Adv. Linda Makatini, Mintek Board Chairperson (left), Dr. Vuyelwa Toni Penxa, Mintek Board Member (right).

SUSTAINABLE DEVELOPMENT 5

Sustainability reporting combines economic performance with social responsibility and environmental care. It aims to help businesses set goals. It also measures performance and manages change towards sustainability. The benefits of sustainability reports, and the reporting process, include setting improvement targets which in turn drive efficiencies and natural resource stewardship, encouraging companies to develop strategies for the long term and remains a vital component of employee and stakeholder relations. As reported in the previous financial year, Mintek continues to focus its activities to ensure that its most critical deliverables are actioned and entrenched. As such, the focus areas tabled below and reported on will continually being considered over the long term.

PERFORMANCE AGAINST MINTEK'S SUSTAINABILITY FOCUS AREAS 5.1

The table below lists Mintek's sustainability-related focus areas and summarises its progress in addressing these areas.

HOW MINTEK PERFORMED IN 2015/16 FY	WHAT MINTEK IS COMMITTED TO				
Spent 2% of payroll, amounting to over R5.5-million, on training and development interventions for its employees. Training comprised 71% core/technical business and 29% soft skills.	✓ Continue positive progress towards achieving employment equity in the workplace.				
Allocated 31 full time and 117 part time bursaries towards feeding its bursary pipeline and for the recruitment and retention of critical skills.	\checkmark Integrate graduates into the Mintek environment.				
Achieved 89% of designated group representation against a target of 90%.	✓ Increase innovative activities centred on graduate mentoring and training of mentors.				
31 employees benefited from effective leadership development programmes.	Enhance coaching and mentoring for management.				
Achieved 10% staff turnover rate against a target of 10% or less.	Increase the proportion of staff with MSc and PhD degrees.				
Achieved a 3% loss of working days due to absenteeism, against a target of 3.5%.	Roll out more women and people with disabilities empowerment strategies.				
Hosted 10 wellness interventions against a target of 3.	✓ Have a structured mentorship programme to transfer skills and knowledge from specialists to mid-level professionals.				
	\checkmark Continue efforts to build a values-driven high-performance culture across all of the operations.				
	Continue to implement strategies to retain professional staff at Mintek				
	✓ Develop the capability and increase the ability of Mintek to attract a broad spectrum of young graduate scientists and/or engineers.				
	Continue to enhance employee health and wellness programmes.				

INVESTING IN MINITER'S DEODIE

Health & Safety at Mintek is required within a selection of different work environments and technical divisions.



ENSURE SAFETY, HEALTH AND WELLBEING OF MINTEK'S PEOPLE

HOW MINTEK PERFORMED IN 2015/16 FY	WHAT MINTEK IS COMMITTED TO
The Lost Time Injury- and Health Incident Frequency rates at year-end were 0.3 and 0 respectively, both below the targets of 1.0.	Continue efforts to have zero harm in all areas of safety, health and wellness.
There were no major environmental incidents reported during the year.	✓ Continue blood donation drives, TB screening initiatives and weight maintenance programmes.
There were no work-related fatalities during the year.	✓ Increase audiometry and ENT initiatives amongst employees to determine incidences of hearing loss due to noise.
Mintek had a total of 29 injuries on duty, with 3 resulting in lost time from work.	Continue efforts on HIV/AIDS awareness and support.
Conducted 887 medical surveillances for employees, bursars and trainees, including 199 entrance medicals and 125 exit medicals.	
A total of 768 spirometry tests were performed	

MINTEK'S RESPONSE TO ENVIRONMENTAL CHALLENGES

HOW MINTEK PERFORMED IN 2015/16 FY	WHAT MINTEK IS COMMITTED TO		
Mintek's recycled waste has been dealt with in accordance with SANS 10234.	To continuously report on environmental process improvements.		
Nearly 19 000 kg of waste was recycled, compared to around 22 000 kg the previous year.	\checkmark To intensify efforts to save water through the reticulation project.		
Approximately 81.6 tons of scrap metal was recycled, up by 27% on the previous year.	✓ Further investments and increased investigations to reduce atmospheric emissions.		
▶ Total carbon emissions decreased by nearly 50%, at15 148 tons/year CO ₂ .	✓ To continue benchmarking efforts for the establishing of best practice and identify areas of improvement in Mintek's water footprint.		
Total water consumption has decreased from 90.2 last year to 65.1 megalitre this past year.			





THE QUALITY OF MINTEK'S WORK

HOW MINTEK PERFORMED IN 2015/16 FY	WHAT MINTEK IS COMMITTED TO
All technical divisions managed to achieve external customer satisfaction rates of above 90%. Mintek's average rate at the end of the year was 97%.	√ To continue the integration of Mintek's audits for ISO 9001, ISO 14001 and OSHAS 18001.
All technical divisions reached their 80% target for project information chart (PIC) submission success. PIC is a measure of the quality of the initial information on environmental aspects and compliance with Mintek codes and policies.	√ To continue with value-adding process improvements, process performance and management programmes with regards to quality of Mintek's research and technology development work.
Mintek produced 61 technical articles in credible publications (74% higher than the target of 35). It also far exceeded the number of conference presentations and posters (85% higher than the target of 68)	√ To increase training interventions and ensure that more employees are educated on ISO9001 changes.
Mintek filed 10 patents, which was doubled the target set. In addition, they also doubled the target of 2 IP license agreements by concluding 4 during the year and made 14 new discoveries against a target of 10.	√ To continually work on improving external and internal customer satisfaction rates.
	✓ To continue to send more promising young scientists and engineers to participate at relevant conferences.

SMALL BUSINESS AND SUPPLIER DEVELOPMENT

HOW MINTEK PERFORMED IN 2015/16 FY	WHAT MINTEK IS COMMITTED TO
Successfully adapted and developed 2 new technologies relevant to small scale operators, for transfer to rural and marginalised communities.	✓ Continue efforts to develop and support economically sustainable rural and marginalised communities.
Mintek also successfully created 5 new businesses under the objective "development and support of economically sustainable rural and marginalised communities'. From these businesses, 33 jobs were created, unfortunately falling short of the target of 60 jobs.	✓ Intensify training and skills development interventions in rural and marginalised communities.
All businesses set up in 2015 are still in existence and 71% of businesses set up in 2014 are still in operation.	
In partnership with the MQA, Mintek was able to exceed its target of training 60 people by 12% in areas that are relevant to rural and marginalised communities.	
Spent 95%, against a target of 60%, on BEE procurement as a % of discretionary spend.	

SUSTAINABLE DEVELOPMENT



5.2 INVESTING IN MINTEK'S PEOPLE

Overview

Mintek continues to prioritise training and retention of skilled and suitably qualified scientists and engineers. Mintek focuses on interventions that will accelerate progress towards achieving the need for science and engineering skills aligned the country's social and economic priority goals. Some of interventions include internally focussed skills development, training and development of employees, as well as interventions that have an external focus. Externally focused programmes are aimed at developing science and engineering students by providing undergraduate/postgraduate bursary programmes for full-time study, internships and mentoring. Mintek will also endeavour to promote parity in the participation of South Africans in science, engineering, technology and innovation (SETI) research, acknowledging the focus that is still required to increase the number of women in the sector. Further, in recognition of the importance of promoting national R&D competitiveness in the mineral sector, the attainment of higher degrees, notably MSc and PhD, is an organisational priority.

Employee Statistics

On 31 March 2016, the total permanent employee count at Mintek was 675 which comprised 399 males, 256 females and 20 foreign nationals. The number of employees at an occupational level followed a similar trend to 2015 i.e. skilled technical, academically-qualified, junior management and supervisors (359) > semi-skilled occupational level (137) > professionals, specialists, and middle management (97) > unskilled (63) > senior management (13) > top management (6). Mintek continues to encourage women in science and technology and has increased the total percentage of women from 33% in the previous year to 39% in this financial year. Externally focused programmes are aimed at developing Mintek's future pipeline of science and engineering candidates by providing undergraduate and postgraduate bursary programmes for full-time study and internships supported by mentoring.

Employee development programmes

Employee development programmes include short courses, degree/diploma and certificate programmes, management development and mentorship programmes. Mintek's total spend on training and development is a good indicator of its commitment to employee development. The total amount paid to service providers for training during the financial year was R5 532 291. Mintek spent approximately 71% on core/technical training and the balance on soft skills training activities.

Through a partnership with Wits Business School, 31 employees were enrolled for management development and new manager programmes. The courses included the New Managers Programme (NMP) and the Management Advancement Programme (MAP) which commenced in early 2015. This is the fourth MAP course to be offered at Mintek which aims to groom employees for senior leadership positions in the organisation. The NMP course

was offered for the first time and prepares employees at an early stage for advancement into senior positions within Mintek. Eight students successfully completed the MAP course while 18 completed the NMP.

Mintek implemented a mentorship programme and arranged a course on the fundamental requirements of mentors and mentees. The programme offered to Mintek employees is aimed at building strong working teams that will form part of a succession planning strategy and ensure sustainable business operations. 32% of the researcher and scientist category of employees are participating in the programme.

13 Mintek employees attended the Basic South African Sign Language (SASL) training course. The five-day training course, divided over five weeks, was facilitated by eDeaf and focussed on improving employees' ability to communicate with deaf and hard hearing people through sign language.

Mintek has partnered with the Mining Qualification Authority (MQA) to deliver an Artisan Learnership Programme. Through their funding and support 9 internal learners are progressing through the course with 6 external learners appointed in March 2016. The 6 external learners are all female.

Pipeline development programmes

To support a workforce that is more mobile and youthful in character, programmes should actively attract, develop, mentor and retain staff in both technical and management-related positions. One constant is a need for employees with a sound basis in science, engineering principles and analytical capabilities. In this regard, Mintek will continue with its bursary programmes to maintain its graduate pipeline over the long-term. At the same time, the graduate development programme and coaching and mentoring programmes are designed to provide a more structured approach to nurturing and advancing the skills and capabilities of both new graduates and existing employees in Mintek. The former will emphasise on-the-job technical training supplemented with formal supervisory and management training, while the latter programme will promote a culture of continuous learning and growth within Mintek.

Mintek awarded 31 full time bursaries during the financial year. Of the 18 undergraduates, and 13 postgraduate students, Mintek absorbed 2 undergraduates and 3 postgraduates. Mintek's strategy to focus on increasing the number of female and African student engineers and scientists continues. Of the 26 full-time bursary students, 69% are female and 31% are from previously disadvantaged groups.

Under the Graduate Development Programme (GDP), 13 graduate trainees completed the first 15-month programme at the end of March 2016. The performance of all GDPs has either met or exceeded requirements. The graduate trainees competency levels are measured by





Training and development of bursars, scientists and engineers and other supporting staff across all divisions at Mintek.

assessments as they rotate between various Mintek Divisions as well as records of attendance and participation in training programmes, recorded in a portfolio of evidence which is then used to update performance scores in the Mintek performance management system.

The DST/NRF Internship programme is an annual programme facilitated by the DST through the National Research Foundation (NRF). There are currently 8 candidates on this programme. The Professional Development programme is a critical initiative, aiming to address the shortage in the number of students registering for full-time post-graduate studies. The programme is implemented in partnership with DST/NRF and it entails the hosting of full-time pre- and postdoctoral students at Mintek on a fixed-term contract basis such that the students conduct their research using Mintek equipment and resources.

Mintek, in partnership with the MQA, participates in a Work Experiential Scheme, known as Work Integrated Learning (WIL), to offer practical learning to students from Universities of Technology. The practical learning forms part of the requirement to qualify for a National Diploma. Mintek appointed 29 new students with 58 currently enrolled in the programme. 27 students completed the program in February 2016 and two are not MQA funded. The programme provides an opportunity for Mintek's technical divisions to assess these learners for future absorption into full time employment at Mintek whilst they are gaining in-service experience.



Dr. Gebhu Ndlovu graduating with a Certificate of Competence from Wits Business School after completion of the New Manager's Programme (NMP).

Long Service and Apex

In December 2015, Mintek held its Annual Excellence Awards ceremony to recognise employees for long service and innovative excellence. Long service employees received certificate awards while innovative employees were presented with Achievement of Performance Excellence (APEX) trophies and cash awards.

APEX awards were presented in Development, Procedural Innovation; Technology Transfer and Technical Innovation categories.

Long service awards were presented to employees for 5, 10, 15, 20, 25, 30 and 40 year service.

The Diversity Walk, organised to promote teamwork and team diversity in the workplace, followed the annual Excellence Awards ceremony. 550 employees dressed in bright and colourful, Sisonke, Diversity Forum branded t-shirts and caps took on the challenge of the 5km fun walk.

Recognitions

Dr. Rodney Jones, a Senior Technical Specialist consultant at Mintek, was appointed president of the Southern African Institute of Mining and Metallurgy in August 2015. SAIMM is one of the oldest learned societies in South Africa, established in 1894 and Dr. Jones has been a member since 1988. He holds a BSc (Eng) Chemical Engineering (Wits University), BA in Logic and Philosophy (UNISA), MSc and PhD degrees in Metallurgical Engineering (Wits University) and is an enthusiastic person who respects people as individuals, and places a high value on personal relationships. In his presidential address, Dr. Jones said that "Scientific progress relies on the publication of ideas and experimental results that can be replicated, tested, and improved over time. In this frenetic environment, it is essential that researchers are able to trust the material they read".

Mr. Chris Fletcher was appointed as Advisory Board Chairman for the Engineering faculty at the Vaal University. Mr Alan McKenzie and Mr Peter Craven sit on the chemical engineering advisory boards of the University of the Witwatersrand, the University of Pretoria and the University of Cape Town respectively. Mr Alan McKenzie also sits on the chemical engineering board of the University of Kwa-Zulu Natal.

Mr. Nirdesh Singh was appointed the new Deputy Chair of the NSTF Executive Committee. Mr. Sakhi Simelane, Mintek GM: Finance, was appointed as Chairperson of the UNISA Council.

Mintek undergraduate bursars for the class of 2015 were honoured for excellence in academic performance at the Undergraduate Bursar Seminar held on 21 January 2016 at Mintek. The annual seminar is held to motivate and inspire performance excellence of the Mintek bursars during their studies.

Mintek hosted the first "Women in Mintek" Indaba on 05 June 2015 as a series of interventions to attract more women to Mintek. Female employees were given a platform to raise concerns, share opinions, discuss achievements and explore ways of creating an enabling environment for aspiring young women. Mintek has set a target of 47% women representation over the next three years and is currently at 39%. The Honourable Minister in the Presidency, Responsible for Women, Ms Susan Shabangu attended and commended the initiative.

LONG SERVICE AWARDS







John William Neale Patrick Tshisikawe

McCullough

Leon Swanepoel





Norman Senoamali Peter Vhulahani

Bhekumuzi Amon Mdlalose



RECOGNITIONS

Dr. Rodney Jones, (a Senior Technical Specialist at Mintek), was appointed president of the Southern African Institute of Mining and Metallurgy in August 2015.

Mr. Chris Fletcher, (a Principal Technician at Mintek's Advanced Materials Division), was appointed as Advisory Board Chairman for the Engineering faculty at the Vaal University.

Mr. Nirdesh Singh, (Manager at Mintek's Small Scale Mining & Beneficiation division), was appointed the new Deputy Chair of the NSTF Executive Committee.

Mr. Sakhi Simelane, (Mintek's General Manager: Finance,) was appointed as Chairperson of the UNISA Council.



APEX AWARDS

CATEGORY: Procedural Innovation		CATEGORY: Development	CATEGORY: Development
TITLE:	Automation of Business Workflow on Microsoft SharePoint	TITLE: The Development of the StarCS Aut	tomodeller TITLE: The successful demonstration of low- grade chromite smelting process
WINNERS:	Patience Ndara (MaC Division), Mahendren Thorusley (MaC Division) & Tiyiselani Tshuketana (IT Division)	WINNER: Dr Loutjie Coetzee (MaC Division)	WINNERS: Pranusha Moodley, Glen Denton & Thabiso Ntloko (Pyrometallurgy Division)
	CATEGORY: Technology Transfer	CATEGORY: Technology Innovation	CATEGORY: Development
	CATEGORY: Technology Transfer	CATEGORY: Technology Innovation	CATEGORY: Development Image: Development <t< th=""></t<>
TITLE:	CATEGORY: Technology Transfer	CATEGORY: Technology InnovationImage: Additional systemImage: Additional s	CATEGORY: Development Image: Colspan="2">Contended of the state of the

5.3 SAFETY, HEALTH AND WELLBEING OF MINTEK'S PEOPLE

Employee and service provider safety

SUSTAINABLE DEVELOPMENT

Employee and service provider safety hold tremendous importance for Mintek. Mintek appreciates that every employee and service provider has the right to work and operate in a safe and healthy environment. No employees or service providers should have to suffer because of avoidable dangers in the workplace.

Mintek continues to provide adequate training regarding all safety-related operations and are mindful of the fact that an unsafe environment will most likely translate into employee reservations of Mintek's consideration towards employee wellbeing.

During the past financial year, Mintek had 4 corporate safety, health, environment and quality meetings and the standard agenda for safety aspects included inter alia:

- Progress against safety and health targets;
- Customer satisfaction frequency rates, both internal and external;
- Occupational health and wellness;
- All audit results, including legal and integrated SHEQ audits;
- Process improvements and management programs;
- Training and inspections;
- Progress on radiation protection, and nuclear material management; and
- Review of policy, objectives, targets and procedures.

Employee Wellness

Mintek believes that employees who feel safe and comfortable in their work environment are more likely to remain healthy and be more productive, compared to employees operating in a non-conducive working environment. Therefore, fixing workplace hazards will keep employees performing at their best through each workday, instead of recovering from injuries.

Mintek's employee wellness programme is a comprehensive programme that includes occupational and primary health management provided under the auspices of its Clinic, as well as the Employee Assistance Programme (EAP). Mintek provides and monitors occupational and non-occupational health care.

Occupational Health Care

Occupational health is a specialist branch of medicine that focuses on the physical and mental wellbeing of employees in the workplace. The aim of occupational health provision at Mintek is to prevent work-related illness and injury by, amongst others:

- monitoring the health of employees;
- encouraging safe working practices;
- supporting the management of sick leave;
- conducting pre-employment health assessments;
- supporting health promotion programmes;
- providing advice and counselling to employees around non-health-related problems; and

 providing Mintek with advice and guidance around making reasonable adjustments to employee working conditions.

During the past financial year, the Mintek Clinic conducted and coordinated a total of 887, medical surveillance examinations, down by 9% on the 2015 total of 978. The surveillance programme comprised entrance, annual, executive and exit examinations.

Spirometry tests were conducted throughout the year. Spirometry is a common office test used to assess the wellness of lungs by measuring air intake, the amount exhaled and the rate of exhaling. Spirometry is used to diagnose asthma, chronic obstructive pulmonary disease (COPD) and other conditions that affect breathing. Spirometry tests were omitted in those employees with severe hypertension, recent surgery, pregnancy and severe respiratory tract infections. A total 768 tests were performed on employees during the year.

Mintek had a total of 29 injuries on duty. Of these injuries, 3 (10%) led to lost work time. Some of the minor injuries suffered were due to a combination of unsafe work practices, which affected mostly injuries to hands, as well as failure to wear or improper use of personal protective equipment.

Other health and wellness assessments and services that Mintek employees had access to during the year were chest X-rays, audiometry screening, which tests hearing levels and are conducted to measure if there are any employee incidents associated with noise induced hearing loss and biological monitoring. The latter includes the monitoring of levels of cadmium, chromium, cobalt, lead, manganese, nickel, uranium and radiation.

Non-Occupational Health Care

Mintek also provides Primary Health Care (PHC) services for employees. These employees visit the clinic primarily due to reasons which are often attributed to seasonal factors such as respiratory tract infections, gastro-intestinal infections and muscular-skeletal problems.

On average Mintek assists 327 employees per quarter with PHC needs. PHC comprises general clinic consultations, doctor's consultations, chronic follow ups, occupational health follow ups and family planning (11% of total visits). 18% of the total number of PHC visits are dealt with by the clinic doctor, with the remainder being handled by the full time clinic staff.

Mintek also provides an HIV/Aids programme which focuses on preventing new infections through awareness and education, and access to testing, counselling and treatment. Mintek provides support services to HIV-positive employees through an HIV management programme. For the past financial year, Mintek spent a total of R65 496 on costs for blood tests, booster packs, vitamins, meal boxes and Bactrim tablets for staff members on the programme.

Employee Wellbeing

Workplace health and wellbeing is most effectively achieved through a combination of policies and programmes that address a range of factors, including the general principles of prevention, hazard identification, risk assessment and health surveillance. Effective workplace health promotion requires demonstration of leadership and commitment along with policies and procedures on recruitment, development, training, human resource management, consultation, communication and rehabilitation.





Mintek believes that health and wellbeing can be achieved through a combination of prevention, promotion and rehabilitation interventions. Mintek also believes that by relentlessly pursuing effective health promotion and placing value on the health of its employees, the organisation enjoys advantages such as motivating employees, improving Mintek's profile, attracting new employees and improving workplace morale.

Mintek promotes employee wellbeing through programmes such as weight-loss maintenance programmes, TB Screening and HIV Prevalence Surveys. Throughout 2016, the Mintek Clinic offered, as they did in 2015, to support those employees that participate in the annual Biggest Loser Competition. This competition is aimed at promoting and maintaining a healthier lifestyle. The competition provides employees with weight-loss monitoring cards, regular weight measurements, meal plans and limited periods of free gym membership in an attempt to encourage employee wellbeing.

Employees have access to Mintek's in-house Employees Assistance Programme (EAP). This service is intended to assist employees with amongst others, work performance related interventions, sick leave management interventions, self-referrals and management referrals, which are typically characterised by those employees who were referred for assistance where transgressions were committed. In dealing with corrective measures cases, the EAP practitioner uses constructive techniques to help employees understand the implications of their conduct.

The year saw numerous wellness interventions organised by the Human Resources Division. These interventions which attracted many employees, included a health awareness week which brought along medical aid screening services, blood donation drives, AIDS day screening, retirement seminars which target all pre-retirees and service providers such as Old Mutual, SARS, Department of Labour: UIF and psychologists. Mintek also hosted a financial wellness event which was organised to assist Mintek employees to stay financially healthy and be savvy with finances. Providers on site included all the big banks, credit bureaus and other financial service providers.

On 25 November 2015, the City of Johannesburg's Health Department visited Mintek as part of the citywide HIV/AIDS awareness campaign towards the build up to World Aids Day. World AIDS Day is commemorated each year on 01 December and is an opportunity for every community to unite in the fight against HIV, show support for people living with HIV and remember those who have died.

More than 100 Mintek employees participated in the campaign, which included HIV/AIDS Counselling and Testing, TB screening, Prostate and Cervical Cancer screening, general

Above: Health & Safety at Mintek is required within a selection of different work environments and technical divisions. **Below:** Mintek technician at work in the fire assay laboratory in the Analytical Services Division.



health screening and distribution of male and female condoms.

Mintek also held a candlelight memorial in June 2015 at which HIV/AIDS awareness was conveyed through a stage play "Scandalous". The show educated Mintek employees on measures that could be taken to reduce the risky sexual behaviour, which leads to the spread of AIDS. Although this event is observed throughout the world on the third Sunday of May, Mintek held its candlelight memorial in June, as tribute to colleagues and friends who have departed due to HIV/AIDS, cancer, diabetes and other diseases.



5.4 ENVIRONMENTAL CHALLENGES

In an increasingly environmentally conscious world, all businesses have an ethical and moral obligation to protect the environment. In this regard, Mintek is increasing its efforts to ensure the environment's protection and continually strives to be a responsible consumer of limited resources.

Mintek's purpose is to improve the health and well-being of its employees and all stakeholders and therefore must protect the environments in which it operates. Mintek therefore sets high standards for its operating divisions in the area of environmental responsibility, striving for performance that does not merely comply with regulations but reduces its environmental impacts.

Mintek develops technology solutions for its clients. These solutions are always designed on a basis of minimising environmental impact and maximising resource sustainability. This means extracting maximum value from the feed materials, while minimising the power, water and other resource inputs, while also minimising effluent discharges.



Mintek's waste management activities

Mintek continued to make significant progress in managing waste at Mintek through effective separation and recycling techniques. Mintek also embarked on campaigns where it reminded employees on how to deal with day to day general waste and encouraged them to comply with the 4Rs: Reduce, Reuse, Recycle and Rethink waste. At Mintek, the 4 Rs are used as a tool to reduce carbon footprint and employees have been made aware to:



- **Reduce:** By using less, we help conserve valuable resources such as water and energy. Employees have been encouraged to reduce consumption by only printing documents when absolutely necessary.
- **Reuse:** Employees were reminded that conscious consumers purchase durable products that are meant to last as opposed to poor quality products which soon add to the waste stream.
- **Recycle:** Recycling conserves resources by keeping them in circulation.
- **Rethink:** Employees were reminded to consider the consequences of their actions and what impacts these will have on the environment.

Mintek internal waste recycled during the past financial year, as depicted below, consisted primarily of cardboard, paper and plastic bottles, and in a lesser mass, newspapers, cans and polypropylene. A total of nearly 19 000 kg of waste was recycled. Scrap metal waste recycled during the past financial year averaged around 6 800 kg per month with a high of 19 280 kg collected in June 2015.

With the funding received from National Treasury, Mintek continues to position South Africa as a strategic player in the global market for "urban mining" initiatives. Two types of waste are currently targeted for re-processing:

- Industrial waste: electronic waste, autocatalysts and foundry waste.
- Mining and processing waste Waste rock and process tailings originating from gold and uranium operations.



Mintek's Carbon Footprint

The 2015-2016 FY saw Mintek conclude its fourth annual carbon footprint account. For the financial year ending 31 March 2016, Mintek emitted 15,148 tCO₂eq. This is approximately 46% lower than the baseline emission reported in 2011 and almost 50% lower than the value recorded in the 2014/15 financial year. This is mainly attributed to less electricity-intensive smelting testwork undertaken during the year.

New South African legislation and regulations have been published for public comment within the past year and Mintek is keeping track of developments in this regard. The current draft legislation on taxation of carbon emissions indicates that Mintek is still outside the scope of mandatory greenhouse gas emission reporting, even though Mintek might be taxed on its Scope 1 emissions. A further impact on the organisation will be the anticipated pass-through cost of carbon tax levied against the national energy supplier, Eskom. While these tax effects are anticipated in future, the actual mechanisms of taxation have not been signed into law yet.

In terms of Mintek's operational environment, the implementation of a successful electricity consumption monitoring system has resulted in very accurate, real-time data being available. As electricity consumption is the single largest source of emission from Mintek, this development means that the bulk of the carbon footprint reporting is done simply and accurately.



The graph below depicts Mintek's carbon emissions since the base year in 2011.



The Table below details the carbon emissions for Mintek during the 2015/16 FY

Emission source	Consumption	Consumption unit	Note	Factor (kg CO ₂ / unit)	CO ₂ equivalent (tons/year CO ₂)	% of total emissions
Direct emissions (Scope 1)	80.94	0.53				
Process emissions – Bay 1 & Bay 2	35.93	ton/year	а	1.00	35.93	0.24
Direct coal used	0	ton/year	а	0	0	0.00
Direct diesel used	13 494.00	litres/year	b	2.6391	35.61	0.24
Direct LPG used	4 962.00	kg/year	С	1.5023	7.45	0.05
Direct CO ₂ used	1 941.00	kg/year	С	1.00	1.94	0.01
Energy use related emissions (Scope 2)	14 461.69	95.47				
Electricity consumption	14 519 770.00	kWh/year	d	0.996	14 461.69	95.47
Indirect emissions (Scope 3)	605.69	4.00				
Domestic & international flights	2 849 160.00	-	е	0	501.77	3.31
Car use (petrol)	392 489.00	km/year	f	0,2128	83.52	0.55
LDV use (diesel)	79 748.00	km/year	f	0.2558	20.40	0.13
Total annual emissions (tCO ₂ e)	15 148.32					

Notes:

a – Data as reported by Pyrometallurgy Division

b - Data provided by Engineering & Maintenance Services

c - Data not available at time of report compilation - assume same value as 2014/15

d - Metro billing system data verified by Mintek own metering

e - Data provided by Mintek travel agent already converted

f - Data as reported by Mintek Transport office

Mintek's Water footprint

The past financial year saw the recording and compilation of the first Mintek corporate water footprint report. The report aims to establish the water footprint concept in Mintek and also to determine the amount of water used by Mintek for the period. During the process of developing this report and through various internal processes and research outcomes, the verification of the methodologies used to determine Mintek water footprint have been refined.

As part of its sustainability reporting, Mintek is embarking on developing data logging that records all its resources consumption and waste emissions from its operations with the aim of developing the full environmental footprint of the organisation. This report therefore also provides recommendations towards corporate response strategies as part of sustainability assessment and response formulation phases of the water footprint assessment.

Benchmarking of Mintek's water footprint against that of similar organisations was also performed as an internal exercise to identify best practice and to identify areas for improvement.

Within the course of the past year, Mintek has vastly improved its on-site monitoring and

measurement of water flows around the Campus, This measurement system is still not perfect, but it has already allowed a critical assessment of where water losses occur and the improved measurement has resulted in direct management controls being implemented that have reduced the direct water consumption by almost 30%.

Further analysis will be performed in the next water footprint report in order to identify specific trends in the company's water use against the current consumption as a baseline.

Already, the more accurate measurement of water flows around the Mintek campus has resulted in new initiatives being tabled for future consideration. These include:

- Replacing potable water used with non-potable water to water Mintek' lawns or possibly replace the current lawns with drought-resistant landscaping; and
- Reducing Mintek's net water consumption. Treated wastewater can be recycled in order to be used into Mintek's technical divisions for testwork, laboratories, and recharging the groundwater/borehole water.



5.5 QUALITY OF MINTEK'S WORK

Promoting effective products and services

Managing quality is crucial for Mintek and as such Mintek views quality as critical to satisfying its customers and retaining their loyalty so that they continue to buy Mintek's products and services in the future. Mintek continues to build its reputation for quality by maintaining certification with the ISO 9001 quality management standard By doing so, Mintek ensures the consistent quality of its products and services and this makes an important contribution to its long-term revenue and profitability.

After delivery of every product or service, Mintek customers are asked to complete a survey which contains questions pertaining to satisfaction with the product or service, promptness of delivery, communication, "value for money", and whether customers will bring repeat business and recommend Mintek's to others.

At the end of the 2015/2016 FY, all Mintek's technical divisions were able to achieve customer satisfaction frequency rates (CSFR) above the corporate target of 90%. This realised an overall Mintek CSFR of 97%.

The graph below shows Mintek's overall achievement of customer satisfaction since the end of the 2011/12 financial year.

Project information, safety and the environment

All Mintek's technical divisions monitor the risks associated with their work via project information charts (PIC). The quality of the information submitted for the risk assessment is measured by the PIC submission success rate where the target has been set at 80%.

The PIC objective is to confirm that all Mintek's projects have been considered regarding theirs:

- Environmental and safety aspects;
- Compliance to current environmental and safety legislation; and
- Compliance to Mintek Codes of practice and policies.
- Environmental and safety aspects;
- Compliance to current environmental and safety legislation; and
- Compliance to Mintek Codes of practice and policies.

Key items that are considered are whether the project involves the treatment of solid or liquid materials; whether it involves the building or operation of equipment and whether the project has any potential significant environmental or safety risks. During 2016, all Mintek technical divisions were able to achieve submission success rate of higher than the 80% target.

EXTERNAL CLIENT SURVEY

Mintek has a Client Satisfaction Frequency Rate target of ≥ 90%. Mintek is currently at 97% as shown in the graph below. This objective has been achieved.





Continuous training of technical personnel

During the year, the SHEQ corporate team had a number of training sessions which focused, amongst others, on overhead crane control, emergency preparedness, hazardous chemical handling and storage and forklift driving. Mintek also ensures that it has a sufficient number of employees that are educated on ISO9001 changes and that can serve as integrated SHEQ lead auditors. Other training courses and activities included Safety awareness (OSHAS18001 system and OHS Act legal requirements), hearing conservation, and corrective action, preventive action, root cause analysis and incident investigation and reporting.

5.6 PRODUCT STEWARDSHIP

Product stewardship, otherwise known as Extended Product Responsibility, is where environmental, health, and safety protection centers on the product itself, and everyone involved in the lifespan of the product is called upon to take up responsibility to reduce its environmental, health, and safety impacts. For manufacturers, this includes planning for, and if necessary, paying for the recycling or disposal of the product at the end of its useful life. This may be achieved, in part, by redesigning products to use fewer harmful substances, to be more durable, reusable and recyclable, and to make products from recycled materials. For retailers and consumers, this means taking an active role in ensuring the proper disposal or recycling of an end-of-life product.

Health and Safety for Mintek's In Vitro Diagnostic Medical Devices

An In Vitro Diagnostic (IVD) Medical Device is a device which, whether used alone or in combination, is intended by the manufacturer for the in-vitro examination of specimens derived from the human body solely or principally to provide information for diagnostic, monitoring or compatibility purposes.

The manufacture of IVDs in Mintek's clean room facilities requires a commitment from both management and the staff to ensure that the health and safety of both the final consumer (patient) and those carrying out the final quality control tests are protected as far as possible.

From a product point of view, the design, manufacture, packaging and method of use must be such that the chances of false negative tests are eliminated and those of false positives are reduced to a minimum. The analysis of the initial design through the manufacture process is based on ISO 14971, Medical Devices — Application of risk management to medical devices, to reduce the risk to the patient to an acceptable level. Other international standards will also be followed to ensure that the quality control aspects throughout the manufacturing process are covered inclusive of the packaging of the final product. The sale of IVDs is highly regulated throughout the world and Mintek is working towards gaining certification to the ISO 13485 standard medical devices – Quality management systems – Requirements for regulatory purposes and also the EU Directive 98/79/EC on in vitro diagnostic medical devices. The latter will allow Mintek to place the CE mark ("Conformité Européene" which literally means "European Conformity") on their IVDs and together they will open a gateway to international markets. Where there are specific regulations for a country that fall outside the EU directive then these will be determined and acted on to ensure that the relevant IVDs become registered.

As part of these standards and regulations Mintek will also carry out due diligence on the products to determine where improvements can be made and also, when and if necessary carry out recalls on any products that are found to be faulty whilst complying with the relevant regulations. In both cases investigations will be carried out and recorded to determine if any proposed improvements can be made or the root cause of a problem determined and reported to the relevant authorities.

Mintek is also committed to the protection of the health and safety of their staff who will be potentially exposed to Hazardous Biological Agents (HBAs) during the testing of devices. Each part of the process will be identified where exposure is possible for each and every HBA and a risk analysis conducted. The results of the risk analysis will then be ratified by an established Bio-safety committee which will include representatives from management, operational staff, OHS representatives, Corporate SHEQ and the Mintek clinic and doctor.

Protection takes the form of the environmental control of the BSL3 facility, use of specialised and validated equipment, recommended personal protective equipment and thorough training of staff. Where possible, prophylactics such as vaccinations will be made available to staff working in the area and when required, access to the facility through the biometric system will be suspended (e.g. pregnancy).




From left to right: Learners participating in Mintek's National Minquiz Competition (a-c), (d) Edson Muhuma getting shaved for Shavathon. **Right:** Mintek employees at the Cansa Shavathon event. **Below:** Candle Light Memorial Service in honour of cancer survivors.



5.7 CORPORATE SOCIAL RESPONSIBILITY

Mintek continually strives to operate in a manner that accounts for the social and environmental impact created by the business. As such, Mintek is committed to developing policies that integrate responsible practices into daily business operations, and to reporting on progress made toward implementing these practices.

At the school level – Encouraging learners to become scientists and engineers

Mintek promotes science, technology, engineering and mathematics through its Minquiz competition which is a national science competition for Grade 12 learners. In addition, Mintek also exhibits at career exhibitions and youth development programmes through the year.

During the past year, Mintek exhibited at the Public Service Careers exhibition hosted by the KZN Office of the Premier, in partnership with Provincial Departments in Margate, from 09 -11 February 2016. The purpose of the exhibition was to respond to the skills supply pipeline challenges facing the Public Service sector. It also provided an opportunity for learners to be exposed to possible career paths in the public sector, nationally and provincially. On 24 February 2016, Mintek participated in the Kwazulu Natal Department of Education Leadership and Career Development Seminar for Grade 12 learners. The seminar targeted 300 top performing learners in the Province with the aim of developing learners' self-confidence and leadership skills as well as to expose them to post-matric study and bursary opportunities. In early March 2016, Mintek exhibited at Scifest Africa 2016 in Grahamstown, the largest national science festival in Africa aimed to promote public awareness of Science, Engineering and Technology. Mintek also exhibited at the SABC Education Career Indaba held at the Sandton Convention Centre. The Career Indaba, held in partnership with the SABC and the Department of Basic Education provided students, parents and teachers with practical knowledge on how students can succeed in their lives after school and studying. Learners also had an opportunity to learn more about careers at Mintek as well as bursary opportunities.

At the employee level – In Honour of Nelson Mandela

Mintek continues to honour the late former President and peoples' icon around the world, Nelson Mandela through employee initiated interventions in the Gauteng area.

On 31 July 2015 Mintek employees visited the United Cerebral Palsy Association of South Africa and handed over food parcels and clothes donated by employees for Mandela Day. This home provides care to residents, who are affected by cerebral palsy, a disorder of movement,

muscle tone or posture that is caused by abnormal development or damage to the parts of the brain which control movement, balance and posture.

A Mintek team, the uranium runners won a silver medal in the Kaya FM 67km relay for Mandela Day which was held at Nasrec in September 2015. The Mintek team was placed 99th out of 1442 participating teams. This event has a Corporate Social Investment element to it as the partnership with the Nelson Mandela Foundation focuses on areas that are special projects of Nelson Mandela, especially education. The funds raised were for libraries for well-deserving schools with little resources and the libraries were refurbished from old shipment containers.

Supporting Cancer Initiatives

During March 2016 Mintek hosted the annual workplace CANSA Shavathon which featured new exciting activities aimed at encouraging more employee participation. The fundraising campaign raised R31 475 which was an improvement of 13% on the amount raised in 2015.

The event was supported by the International Academy of Hair Dressing, Sandton and Body Definition who volunteered their services to help Mintek with the event.

It is generally believed that more than 100 000 South Africans are diagnosed with cancer every year.

Funds raised during Shavathon are used for cancer risk reduction through education and screening to the public. In addition CANSA offers home-based care support as well as counselling.





GENERAL INFORMATION

Country of incorporation and domicile	South Africa					
Mintek Directors (As of 31 Marc	k Directors (As of 31 March 2016)					
	Adv L Makatini					
	(Chairperson)					
	Adv D Block					
	Dr VT Penxa					
	Dr NS Nhlapo					
	K Mthimunye					
	l Patel					
	G Leso					
	(Drasidant and CEO)					
	(President and CEO)					
Mindev Directors	MA Mngomezulu					
	SA Simelane					
	Dr RL Paul					
	GL Rapoo					
	IVI IVIpnomela					
Registered office	200 Malibongwe Drive,					
	Randburg 2194,					
	South Africa					
Business address	200 Malibongwe Drive,					
	Randburg 2194,					
	South Africa					
Postal address	Private Bag X3015					
	Randburg 2125,					
	South Africa					
Penkere	Alega Daply Limited					
DankerS	Absa Bank Limited					
Auditors	Auditor-General South Africa					



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CHIEF FINANCIAL OFFICER'S REVIEW

Principal activities

Mintek is South Africa's national mineral research organisation and is one of the world's leading technology organisations specialising in mineral processing, extractive metallurgy and related areas. Mintek works closely with industry and other R&D institutions and provides service test work, process development and optimisation, consulting and innovative products to clients worldwide. Mintek is a state owned science council which reports to the Minister of Mineral Resources.

Financial performance

Profitability

During the 2015/2016 financial year Mintek remained financially sustainable and delivered resilient performance despite margin pressures and liquidity concerns faced by the mining industry. The mining industry continued to face a host of unresolved challenges ranging from tumbling demand, increased cost pressures, lack of financing, declining grades and volatile commodity prices.

Mintek's net surplus fell by 22% to R13.8m (2014/2015: R17.6m). Income increased by 4% to R526.8m which is lower than the 9% increase of the previous financial year.



Commercial revenue's contribution to total revenue decreased from 50% during the previous financial year to 36% in 2015/2016. The downward trend for commercial revenue is mainly due to a reduction in the demand of mining research as a result of the slump in the mining industry.

The South African Rand fell to an all-time low during the year under review, not just against the US Dollar but against all major currencies. The devalued Rand affected Mintek's business negatively as it increased the cost of imports which in turn affected the pricing of goods and services. On the counter side, Mintek as a local exporter benefited from the weaker Rand as services rendered to foreign customers resulted in net foreign exchange gains that increased to R1.5m in 2015/2016.

Interest income increased significantly by 24% to R32.8m. The increase is mainly due to strict adherence to Mintek's investment policy that aims to maximise returns within reasonable prudent levels of risk.

EXPENDITURE TRENDS



Total expenditure increased by 5% in 2015/2016 which is lower than the 9% of the previous financial year despite inflationary pressures and the weaker Rand. The marginal increase is mainly due to strategic cost optimisation initiatives and streamlined business processes across the value chain. Although employee related costs decreased marginally by 2% they still remain the biggest cost component of Mintek's operating costs as they contributed to 56%, (66% FY2014/2015) to the total operating costs. The significance of this expenditure is in line with Mintek's business operations that require highly specialised skills.

WORKING CAPITAL



Mintek continued to efficiently manage its working capital in order to improve liquidity and profitability. Trade debtors comprise a major component of Mintek's current assets, debtors days decreased from 54 days in 2014/2015 to 52 days in 2015/2016. The provision for bad debts amounted to R296k in 2015/2016, (2014/2015:R198k). The low bad debts ratio to trade debtors is mainly due to a strict credit policy, monitoring of credit limits and tight debtors collection procedures. Creditor's days decreased from 51 days to 39 days and the current ratio remained stable at 2.2.

Fixed assets

Capital expenditure increased by 69% to R59m in 2015/2016. Fixed assets acquisitions mainly comprised of refurbishment of office buildings, replacement of computer equipment and cash generating machinery. State funding towards the purchase of assets rose by 42% to R46.5m.

During the year under review Mintek revalued its land and buildings by R24m to R204.6m in order to reflect the property at its approximate market value. The revaluation surplus was recognised in equity in terms of SA GAAP. The significant increase in the market value of Mintek's land and buildings reflects the higher returns and steady growth over time associated with commercial property.

Cash Flow Management

Cash and cash equivalents increased from R7.7m in 2014/2015 to R18.6m in 2015/2016. A smaller increase in short terms investments of R19.8m compared to R104.6m in 2014/2015 resulted in more cash at the end of the current year under review.

Going concern

Mintek annual financial statements have been prepared on the going concern basis. The Board has performed a formal review of the Group's ability to continue trading as a going concern in the foreseeable future and based on this review, consider that the presentation of the financial statements on this basis is appropriate. There are no pending or threatened legal or arbitration proceedings, which have had or may have a material effect on the financial position of the Group.

Events after the reporting date

There have been no facts or circumstances of a material nature that have arisen between the financial year-end and the date of this report.



AUDIT AND RISK COMMITTEE REPORT

REPORT OF THE AUDIT AND RISK COMMITTEE – as required by Treasury Regulations 27.1.7 and 27.1.10 (b) and (c) issued in terms of sections 51(1)(a)(ii) and 76(4)(d) of the Public Finance Management (PFMA) Act 1 of 1999, as amended by Act 29 of 1999.

Audit and Risk Committee members and attendance

The ARC consists of the members listed hereunder. During the financial year under review the audit and risk committee held three meetings and appropriate feedback was provided to the relevant Accounting Authority on matters that were within the mandate of the ARC.

NAME	QUALIFICATION	CATEGORY	ATTENDANCE
K Mthimunye	B Compt (Hons), B Com HD (Tax), CA (SA)	non-executive	3/3
N Zikalala	BSc (Chem Eng)	non-executive	1/3
C Leso	BTech (Bus Mgt), Nat Dip (IT)	non-executive	2/3
A Mngomezulu	MSc Engineering (Mining), BSc Hons (Geology),	executive	3/3
M Moalusi	B Acc; CA (SA)	independent	2/3
B Hlongwane	B Com, HD (Acc), CA (SA)	independent	3/3
S Simelane	MBA BCom Hons (Auditing), BCom	executive	3/3
G Nyanda	BPaed, BA Hons, Dip. HRM	executive	3/3
S Bopape*	B. Juris, LLB, MA (Social Policy), Certificate in Development Management, Strategic Leadership Programme	executive	1/3
P Craven	BSc (Chem Eng)	executive	4/4

*Resigned on 16 July 2015

Audit and Risk Committee Responsibility

The Mintek ARC wishes to report that it has complied with its responsibilities arising from section 51(1)(a) as well as with Treasury Regulations 27.1.7 and 27.1.10 (b) and (c) issued in terms of sections 51(1)(a)(ii) and 76(4)(d) of the Public Finance Management Act 1 of 1999, as amended by Act 29 of 1999. The ARC also wishes to report that it had adopted formal terms of reference.

The ARC is able to report that external audit; which is performed by the Auditor-General, is independent of Mintek.

The ARC has discharged all its responsibilities as contained in the ARC charter.

Effectiveness of internal control

The system of internal control and the concomitant control environment within Mintek were reasonably effective.

Governance of risk

The ARC has the responsibility to ensure that a risk management process is in place at Mintek and as such can report that risks are being appropriately managed within Mintek.

Additional information regarding the risk events and their effect on this annual integrated report are detailed elsewhere in the annual integrated report.

Internal audit

The ARC was responsible for ensuring that Mintek's internal audit function was independent and had the necessary resources, standing and authority within Mintek to enable it to effectively and efficiently discharge its duties. Furthermore, the audit and risk committee oversaw cooperation between the internal and external auditors, and served as a link between the accounting authority and these functions.

The ARC considered and approved the internal audit three-year rolling strategic audit plan for the period 2016/2017 - 2018/2019.

Whistle blowing

The ARC received and dealt with any concern or complaints, whether from within or outside of Mintek, relating to fraud, corruption, theft and maladministration.

AUDIT AND RISK COMMITTEE REPORT (CONTINUED)

The quality of management and monthly/quarterly reports submitted in terms of the PFMA

The ARC reports that, during the year under review, they were presented with regular monthly or quarterly management reports to enable them to:

- Monitor the integrity, accuracy and reliability of the financial position of Mintek;
- Review the management accounts of Mintek to provide the accounting authority with an authoritative and credible view of the financial position of Mintek;
- Review the disclosure in the financial reports of Mintek and the context in which statements on the financial health of Mintek are made; and
- > Review all material information presented together with the management accounts.

The quality of budgets submitted in terms of the PFMA

The ARC reports that, during the year under review, they were regularly presented with a budget to enable them to:

- Review and ensure that the annual budgets of Mintek were balanced, credible and realistic against the approved business plans; and
- Monitor and periodically review the implementation of the approved budget of Mintek by the accounting authority.

Evaluation of financial statements

The ARC has evaluated the group and the company Financial Statements for the year ended 31 March 2016 and concluded that they fully complied in all material aspects with the requirements of the Public Finance Management Act (PFMA) no. 1 of 1999, as amended by Act 29 of 1999, and South African Statements of Generally Accepted Accounting Practice (SA Statements of GAAP).

The directors are required in terms of the public finance management act to maintain adequate accounting records and are responsible for the content and integrity of the financial statements and related financial information included in this report.

DIRECTORS' RESPONSIBILITIES AND APPROVAL

It is their responsibility to ensure that the financial statements fairly present the state of affairs of the group as at the end of the financial year and the results of its operations and cash flows for the period then ended, in conformity with Generally Accepted Accounting Policies (SA GAAP) and are based upon appropriate accounting policies consistently applied and supported by reasonable and prudent judgments and estimates. The external auditors are engaged to express an independent opinion on the financial statements.

The directors acknowledge that they are ultimately responsible for the system of internal financial control established by the group and place considerable importance on maintaining a strong control environment. To enable the directors to meet these responsibilities, the directors set standards for internal control aimed at reducing the risk of error or loss in a cost effective manner. The standards include the proper delegation of responsibilities within a clearly defined framework, effective accounting procedures and adequate segregation of duties to ensure an acceptable level of risk.

These controls are monitored throughout the group and all employees are required to maintain the highest ethical standards in ensuring the group's business is conducted in a manner that in all reasonable circumstances is above reproach. The focus of risk management in the group is on identifying, assessing, managing and monitoring all known forms of risk across the group. While operating risk cannot be fully eliminated, the group endeavours to minimise it by ensuring that appropriate infrastructure, controls, systems and ethical behaviour are applied and managed within predetermined procedures and constraints.

The directors are of the opinion, based on the information and explanations given by management that the system of internal control provides reasonable assurance that the financial records may be relied on for the preparation of the financial statements. However, any system of internal financial control can provide only reasonable, and not absolute, assurance against material misstatement or loss.

In the opinion of the directors the group has adequate resources to continue in operational existence for the foreseeable future. This opinion is based on the 2017 budget and the current financial position of the group.

The external auditors are responsible for independently reviewing and reporting on the group's financial statements. The financial statements have been examined by the group's external auditors and their report is presented on pages 80 and 81.

Ms K Mthimunye (Chairperson) for the Audit and Risk Committee 2016

The financial statements set out on pages 82 to 106, which have been prepared on the going concern basis, were approved by the directors on 29 July 2016 and were signed on their behalf by:

Adv Linda Makatini Chairperson

MA Mngomezulu President & CEO, Mintek 2016



DIRECTORS REPORT



Financial Year 2015/2016 Financial performance highlights

The group's underlying surplus of R13,8m is down 22% compared to 2015, reflecting the tough economic conditions that prevailed in the 2015/2016 financial year. Although revenue targets were not achieved due to these tough conditions, the other budgeted objectives were achieved through expenditure savings, resulting in a higher than anticipated surplus.

Revenue rose by 4% from R466.7m to R487.2m in 2015/2016 with a corresponding increase of 6% in operating expenditure. The marginal increase in revenue is mainly due to the continued reduction in the demand for mining research that we have seen in recent years. State grant as a % of revenue increased from 50% to 61% whilst commercial revenue declined by 18%. Mintek's other income mainly comprises of interest received from short term investments and rental income. Interest received has been generated as a result of the investment of cash received from government grants and funding of projects from private sector clients and it amounted to R32.8m in 2015/2016 (2014/2015 : R26.5m).

The Mintek post retirement obligation had an actuarial gain of R3.3m compared to an actuarial loss of R1.4m for the prior year due to favourable assumptions and estimates associated with this obligation. Employee costs as a % of revenue decreased by 4% to R312.2m compared to R318.6m in 2014/2015.

Net surplus as a % of revenue remained low at 3% compared to the 4% in the previous year.

NET WORTH SUMMARY (R'000)



Mintek's liquidity position improved slightly as the current ratio increased from 2.20 to 2.21. Debtors days decreased slightly from 54 to 52 days due to the challenges faced by Mintek's customer base. The increase in net working capital from R274.6m to R286.0m reflected adequate liquid assets to meet short term obligations as they fall due.

Investments amounted to R457.7m and the related interest income earned for 2015/2016 amounted to R32.8m. Mintek continues to exercise caution with its short term investments given the uncertainty and volatility in the mining industry.

Capital asset acquisitions mainly related to office refurbishments, replacement of lifts and cash generating machinery. This increased by 60% from R37m to R59m. Depreciation remained stable at R15m for both years. However the re-assessment of useful lives of assets with zero book value reduced to R2.8m in 2015/2016 compared to R4.9m for the previous year resulting in a higher depreciation for the current year.

Accounting policies

There were no significant changes to the accounting policies during the year. Mintek will be converting from Generally Accepted Accounting Practices (GAAP) reporting to Generally Recognised Accounting Practice (GRAP) Standards from 1 April 2018 as per Directive 12 issued by the Accounting Standards Board during this financial year.

Special items

Special items for the year include the following:

- Revaluation of land and buildings as per the Asset Management Policy, and
- Sale of one of the flats that Mintek held.

Further detail is provided in note 2 of the Annual Financial Statements.

Outlook for Financial Year 2017

The mining business is cyclical in nature and most industry analysts agree that this is just another long cycle in this sector. On the flipside companies that will survive will emerge leaner, stronger and more innovative on how they operate. Most mining companies are already implementing turnaround strategies which involve scrapping dividends, investing only in cash generating assets, shedding unprofitable operations, trimming costs in order to survive and reduce their debt levels. R&D and exploration related activities will remain discretionary spending as mining companies struggle to get back to profitability. For Mintek such a time of commercial slowdown is still ideal to undertake state funded research and development activities as such state funded intervention contributes in positioning the industry to take advantage of the next cyclical upturn.

FINANCIAL PERFORMANCE

REPORT OF THE AUDITOR GENERAL OF SOUTH AFRICA

Report of the auditor-general to Parliament on Mintek group

REPORT ON THE FINANCIAL STATEMENTS Introduction

 I have audited the consolidated and separate financial statements of Mintek group set out on pages 82 to 109, which comprise the statement of financial position as at 31 March 2016, the statement of profit or loss and other comprehensive income, statement of changes in equity, and statement of cash flows and for the year then ended, as well as the notes, comprising a summary of significant accounting policies and other explanatory information.

Accounting authority's responsibility for the financial statements

2. The board of directors, which constitutes the accounting authority is responsible for the preparation and fair presentation of these financial statements in accordance with South African Statements of Generally Accepted Accounting Practice (SA Statements of GAAP) and the requirements of the Public Finance Management Act of South Africa, 1999 (Act No. 1 of 1999), and for such internal control as the accounting authority determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor-general's responsibility

- 3. My responsibility is to express an opinion on these consolidated and separate financial statements based on my audit. I conducted my audit in accordance with International Standards on Auditing. Those standards require that I comply with ethical requirements, and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.
- 4. An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.
- 5. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Opinion

6. In my opinion, the financial statements present fairly, in all material respects, the financial position of Mintek as at 31 March 2016 and its financial performance and cash flows for the year then ended, in accordance with SA statements of GAAP and the requirements of the Public Finance Management Act of South Africa, 1999 (Act No. 1 of 1999).

REPORT ON OTHER LEGAL AND REGULATORY REQUIREMENTS

7. In accordance with the Public Audit Act of South Africa, 2004 (Act No. 25 of 2004) (PAA) and the general notice issued in terms thereof, I have a responsibility to report findings on the reported performance information against predetermined objectives for selected objectives presented in the annual performance report, compliance with legislation and internal control. The objective of my tests was to identify reportable findings as described under each subheading but not to gather evidence to express assurance on these matters. Accordingly, I do not express an opinion or conclusion on these matters.

Predetermined objectives

- 8. I performed procedures to obtain evidence about the usefulness and reliability of the reported performance information for the following selected objectives presented in the annual performance report of the public entity for the year ended 31 March 2016:
 - Objective 2: Research and develop efficient mineral processing technologies and value added products
 - Objective 3: Promote the mineral based economies of rural and marginalised communities
- 9. I evaluated the usefulness of the reported performance information to determine whether it was presented in accordance with the National Treasury's annual reporting principles and whether the reported performance was consistent with the planned objectives I further performed tests to determine whether indicators and targets were well defined, verifiable, specific, measurable, time bound and relevant, as required by the National Treasury's Framework for managing programme performance information (FMPPI).
- 10. I assessed the reliability of the reported performance information to determine whether it was valid, accurate and complete.



REPORT OF THE AUDITOR GENERAL OF SOUTH AFRICA (CONTINUED)

- 11. I did not identify any material findings on the usefulness and reliability of the reported performance information for the following objectives:
 - Objective 2: Research and develop efficient mineral processing technologies and value added products
 - Objective 3: Promote the mineral based economies of rural and marginalised communities

Additional matters

12. We draw attention to the following matters. Our conclusion is not modified in respect of these matters:

Achievement of planned targets

13. Refer to the annual performance report on page 22 to 29 for information on the achievement of planned targets for the year.

COMPLIANCE WITH LEGISLATION

14. I performed procedures to obtain evidence that the public entity had complied with applicable legislation regarding financial matters, financial management and other related matters. I did not identify any instances of material non-compliance with specific matters in key legislation, as set out in the general notice issued in terms of the PAA.

INTERNAL CONTROL

15. I considered internal control relevant to my audit of the financial statements and compliance with legislation. I did not identify any significant deficiencies in internal control.

Auditor general

Pretoria 31 July 2016



Auditing to build public confidence

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION AS AT 31 MARCH 2016

	MINTEK				
Figures In Rand	Note(s)	2016	2015	2016	2015
A					
Assets					
Non-Current Assets	0	000 475 074	007 500 000	000 475 074	
Property, plant and equipment	2	230 175 371	207 560 236	230 175 371	207 560 236
	3	1 /20 0/6	1 450 482	1 /20 0/6	1 450 482
Investments in subsidiaries	4	-	-	100	100
		231 895 447	209 010 718	231 895 547	209 010 818
Current Assets					
Inventories	5	7 002 424	5 516 762	7 002 424	5 516 762
Trade and other receivables	6	40 307 612	52 839 249	40 307 612	52 839 249
Short term investments	7	457 658 378	437 848 120	457 658 378	437 848 120
Cash and cash equivalents		18 589 702	7 652 361	18 589 702	7 652 361
		523 558 116	503 856 492	523 558 116	503 856 492
Total Assets		755 453 563	712 867 210	755 453 663	712 867 310
Equity and Liabilities					
Equity					
Reserves		149 836 771	127 528 399	149 836 771	127 528 399
Retained income		341 808 848	326 657 941	302 293 905	287 142 998
		491 645 619	454 186 340	452 130 676	414 671 397
Liabilities					
Non-Current Liabilities					
Retirement benefit obligation	8	26 284 506	29 405 623	26 284 506	29 405 623
Current Liabilities					
Loans from group companies	9	•	-	39 515 043	39 515 043
Trade and other payables	10	67 134 810	64 350 697	67 134 810	64 350 697
Deferred income	11	169 869 646	164 665 210	169 869 646	164 665 210
Provisions	12	518 982	259 340	518 982	259 340
		237 523 438	229 275 247	277 038 481	268 790 290
Total Liabilities		263 807 944	258 680 870	303 322 987	298 195 913
Total Equity and Liabilities		755 453 563	712 867 210	755 453 663	712 867 310



CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME AS AT 31 MARCH 2016

		MINTEK	GROUP		IINTEK	
Figures In Rand	Note(s)	2016	2015	2016	2015	
Continuing operations						
Revenue	13	487 203 247	466 653 371	487 203 247	466 653 371	
Other operating income	14	6 760 807	10 136 722	6 760 807	10 136 722	
Surplus on exchange differences		1 543 140	1 236 291	1 543 140	1 236 291	
Investment income	15	32 836 026	26 483 150	32 836 026	26 483 150	
Employee costs	16	(312 225 124)	(318 585 881)	(312 225 124)	(318 585 881)	
Operating expenses		(95 578 470)	(95 847 872)	(95 578 470)	(95 847 872)	
Finance costs	17	(3 429 288)	(4 186 826)	(3 429 288)	(4 186 826)	
Auditors remuneration	18	(2 567 259)	(1 886 361)	(2 567 259)	(1 886 361)	
Fees for services	19	(90 653 142)	(54 229 692)	(90 653 142)	(54 229 692)	
Depreciation, amortisation and impairments	20	(15 385 155)	(15 187 216)	(15 385 155)	(15 187 216)	
Reassessment of assets useful lives	20	2 728 171	4 971 647	2 728 171	4 971 647	
Loss on sale of assets		(788 754)	(558 706)	(788 754)	(558 706)	
Actuarial gain/(losses)		3 352 389	(1 388 920)	3 352 389	(1 388 920)	
Surplus for the year		13 796 588	17 609 707	13 796 588	17 609 707	
Other comprehensive income:						

Items that will not be reclassified to profit or

loss:

Revaluation surplus	23 662 691	-	23 662 691	-
Total comprehensive income	37 459 279	17 609 707	37 459 279	17 609 707

CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY AS AT 31 MARCH 2016

MINTEK GROUP			
Figures In Rand	Revaluation reserve	Retained income	Total equity
Balance at 01 April 2014	128 882 718	307 693 915	436 576 633
Surplus for the year	-	17 609 707	17 609 707
Depreciation on revaluation of land and buildings	(1 354 319)	1 354 319	-
Total comprehensive income for the year	(1 354 319)	18 964 026	17 609 707
Balance at 01 April 2015	127 528 399	326 657 941	454 186 340
Surplus for the year	-	13 796 588	13 796 588
Depresistion on reveluation of land and buildings			
Depreciation of nevaluation of land and buildings	(1 354 319)	1 354 319	-
Total comprehensive income for the year	(1 354 319) (1 354 319)	1 354 319 15 150 907	- 13 796 588
Total comprehensive income for the year Revaluation of land and buildings	(1 354 319) (1 354 319) 23 662 691	1 354 319 15 150 907 -	
Total comprehensive income for the year Revaluation of land and buildings Total contributions recognised directly in equity	(1 354 319) (1 354 319) 23 662 691 23 662 691	1 354 319 15 150 907 - -	

MINTEK			
Figures In Rand	Revaluation reserve	Retained income	Total equity
Balance at 01 April 2014	100 000 710	069 179 070	207.061.600
balance at 01 April 2014	120 002 / 10	200 178 972	397 061 690
Surplus for the year	-	17 609 707	17 609 707
Depreciation on revaluation of land and buildings	(1 354 319)	1 354 319	-
Total comprehensive income for the year	(1 354 319)	18 964 026	17 609 707
Balance at 01 April 2015	127 528 399	287 142 998	414 671 397
Surplus for the year	-	13 796 588	13 796 588
Depreciation on revaluation of land and buildings	(1 354 319)	1 354 319	-
Total comprehensive income for the year	(1 354 319)	15 150 907	13 796 588
Revaluation of land and buildings	23 662 691	-	23 662 691
Total contributions recognised directly in equity	23 662 691	-	23 662 691
Balance at 31 March 2016	149 836 771	302 293 905	452 130 676



CONSOLIDATED STATEMENTS OF CASH FLOWS AS AT 31 MARCH 2016

		MINTEK	GROUP	N	INTEK
Figures In Rand	Note(s)	2016	2015	2016	2015
Cash flows from operating activities					
Cash receipts from customers		511 453 061	528 459 039	511 453 061	528 459 039
Cash paid to suppliers and employees		(498 080 821)	(471 853 167)	(498 080 821)	(471 853 167)
Cash generated from operations	22	13 372 240	56 605 872	13 372 240	56 605 872
Interest received		32 059 094	25 048 956	32 059 094	25 048 956
Finance costs		(5 290)	(24 584)	(5 290)	(24 584)
Net cash from operating activities		45 426 044	81 630 244	45 426 044	81 630 244
Cash flows from investing activities					
Additions to property, plant and equipment	2	(59 054 569)	(37 027 319)	(59 054 569)	(37 027 319)
Sale of property, plant and equipment	2	560 000	-	560 000	-
Additions to intangible assets		(641 456)	(126 607)	(641 456)	(126 607)
Funding received towards purchasing of property, plant and equipment	2	46 468 250	32 832 633	46 468 250	32 832 633
Increase in investments		(19 810 258)	(104 604 457)	(19 810 258)	(104 604 457)
Net cash from investing activities		(32 478 033)	(108 925 750)	(32 478 033)	(108 925 750)
Cash flows from financing activities					
Post-retirement health care - settlement		(2 010 670)	(3 629 758)	(2 010 670)	(3 629 758)
Total cash movement for the year		10 937 341	(30 925 264)	10 937 341	(30 925 264)
Cash at the beginning of the year		7 652 361	38 577 625	7 652 361	38 577 625
Total cash at end of the year		18 589 702	7 652 361	18 589 702	7 652 361

ACCOUNTING POLICIES AS AT 31 MARCH 2016

1. Presentation of Financial Statements

The financial statements have been prepared in accordance with South African Generally Accepted Accounting Practices, the Public Finance Management Act and Treasury Guidelines. The financial statements have been prepared on an accrual basis in accordance with historical cost basis except for certain assets and liabilities at fair value, and incorporate the principal accounting policies set out below. They are presented in South African Rand.

These accounting policies are consistent with the previous period.

For purposes of these financial statements, all references to 'Company' refers to Mintek, the public entity.

1.1 Basis of consolidation

The consolidated financial statements incorporate the financial statements of the company and all entities, controlled by the company.

Control exists when the company has the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities.

All intra-group transactions, balances, income and expenses are eliminated in full on consolidation.

1.2 Property, plant and equipment

The cost of an item of property, plant and equipment is recognised as an asset when:

- it is probable that future economic benefits associated with the item will flow to the company; and
- the cost of the item can be measured reliably.

Property, plant and equipment are initially measured at cost.

Costs include costs incurred initially to acquire or construct an item of property, plant and equipment and costs incurred subsequently to add to, replace part of, or service it. If a replacement cost is recognised in the carrying amount of an item of property, plant and equipment, the carrying amount of the replaced part is derecognised.

Land and buildings are carried at revalued amount, being the fair value at the date of revaluation less any subsequent accumulated depreciation on buildings only and subsequent accumulated impairment losses. Revaluations are made with sufficient regularity such that the carrying amount does not differ materially from that which would be determined using fair value at the end of the reporting period.

When an item of property, plant and equipment is revalued, any accumulated depreciation at the date of the revaluation is restated proportionately with the change in the gross carrying amount of the asset so that the carrying amount of the asset after revaluation equals its revalued amount.

Any increase in an asset's carrying amount, as a result of a revaluation, is recognised to other comprehensive income and accumulated in the revaluation surplus in equity. The increase is recognised in other comprehensive income to the extent that it reverses a revaluation decrease of the same asset previously recognised in the Statement of Comprehensive Income.

Any decrease in an asset's carrying amount, as a result of a revaluation, is recognised in the Statement of Comprehensive Income in the current period. The decrease is recognised in other comprehensive income to the extent of any credit balance existing in the revaluation surplus in respect of that asset. The decrease recognised in other comprehensive income reduces the amount accumulated in the revaluation surplus in equity.

The revaluation surplus in equity related to a specific item of property, plant and equipment is transferred directly to retained earnings when the asset is been utilised.

The useful lives of items of property, plant and equipment have been assessed as follows:

Item	Average useful life
Buildings	50 years
Plant and machinery	5 - 10 years
Furniture and fixtures	5 - 10 years
Motor vehicles	5 years
Office equipment	5 - 10 years
IT equipment	3 - 5 years

The residual value, useful life and depreciation method of each asset are reviewed at the end of each reporting period. If the expectations differ from previous estimates, the change is accounted for as a change in accounting estimate.

The depreciation charge for each period is recognised in the Statement of Comprehensive Income unless it is included in the carrying amount of another asset.

The gain or loss arising from the derecognition of an item of property, plant and equipment is included in the Statement of Comprehensive Income when the item is derecognised. The gain or loss arising from the derecognition of an item of property, plant and equipment is determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item.

1.3 Intangible assets

An intangible asset is recognised when:

- it is probable that the expected future economic benefits that are attributable to the asset will flow to the entity;
- the cost of the asset can be measured reliably.

Intangible assets are initially recognised at cost.

Expenditure on research (or on the research phase of an internal project) is recognised as an expense when it is incurred.

Intangible assets are carried at cost less any accumulated amortisation and any accumulated impairment losses.

Gains or losses arising from derecognition of an intangible asset are measured as the difference between the net disposal proceeds and the carrying amount of the asset and are recognised in the statement of comprehensive income when the asset is derecognised.

Amortisation is provided to write down the intangible assets, on a straight-line basis, to their residual values as follows:

Item	Useful life
Computer software	3 - 5 years

1.4 Investments in subsidiaries

In the Mintek financial statements, investments in subsidiaries are carried at cost less any accumulated impairment. The cost of an investment in a subsidiary is the aggregate of:

- the fair value, at the date of exchange, of assets given, liabilities incurred or assumed, and equity instruments issued by the company; plus
- any costs directly attributable to the purchase of the subsidiary.

An adjustment to the cost of a business combination contingent on future events is included in the cost of the combination if the adjustment is probable and can be measured reliably.

1.5 Financial instruments

Classification

The group classifies financial assets and financial liabilities into the following categories:

- Financial assets at fair value through the Statement of Comprehensive Income held for trading
- Held-to-maturity investment
- Loans and receivables
- Financial liabilities measured at amortised cost



Classification depends on the purpose for which the financial instruments were obtained / incurred and takes place at initial recognition. Classification is re-assessed on an annual basis, except for derivatives and financial assets designated as at fair value through the Statement of Comprehensive Income, which shall not be classified out of the fair value through the Statement of Comprehensive Income category.

Initial recognition and measurement

Financial instruments are recognised initially at fair value when the group becomes a party to the contractual provisions of the instruments.

The group classifies financial instruments, or their component parts, on initial recognition as a financial asset or a financial liability in accordance with the substance of the contractual arrangement.

For financial instruments which are not at cost through the Statement of Comprehensive Income, transaction costs are included in the initial measurement of the instrument.

Subsequent measurement

Financial instruments at cost through the Statement of Comprehensive Income are subsequently measured at fair value, with gains and losses arising from changes in fair value being included in profit or loss for the period.

Loans and receivables are subsequently measured at amortised cost, using the effective interest method, less accumulated impairment losses.

Held-to-maturity investments are subsequently measured at amortised cost, using the effective interest method, less accumulated impairment losses.

Gains and losses arising from changes in fair value are recognised in other comprehensive income and accumulated in equity until the asset is disposed of or determined to be impaired.

Financial liabilities at amortised cost are subsequently measured at amortised cost, using the effective interest method.

Derecognition

Financial assets are derecognised when the rights to receive cash flows from the investments have expired or have been transferred and the group has transferred substantially all risks and rewards of ownership.

Impairment of financial assets

At each reporting date the group assesses all financial assets, other than those at fair value through the Statement

of Comprehensive Income, to determine whether there is objective evidence that a financial asset or group of financial assets has been impaired.

For amounts due to the group, significant financial difficulties of the debtor, probability that the debtor will enter bankruptcy and default of payments are all considered indicators of impairment.

Impairment losses are recognised in the Statement of Comprehensive Income.

Impairment losses are reversed when an increase in the financial asset's recoverable amount can be related objectively to an event occurring after the impairment was recognised, subject to the restriction that the carrying amount of the financial asset at the date that the impairment is reversed shall not exceed what the carrying amount would have been had the impairment not been recognised.

Reversals of impairment losses are recognised in the Statement of Comprehensive Income except for equity investments classified as available-for-sale.

Impairment losses are also not subsequently reversed for available-for-sale equity investments which are held at cost because fair value was not determinable.

Where financial assets are impaired through use of an allowance account, the amount of the loss is recognised in the Statement of Comprehensive Income within operating expenses. When such assets are written off, the write-off is made against the relevant allowance account. Subsequent recoveries of amounts previously written off are credited against operating expenses.

Loans to/(from) group companies

These include loans to and from the holding company and the subsidiary.

Loans to group companies are classified as loans and receivables.

Loans from group companies are classified as financial liabilities measured at amortised cost.

Trade and other receivables

Trade receivables are measured at initial recognition at fair value, and are subsequently measured at amortised cost using the effective interest rate method. Appropriate allowances for estimated irrecoverable amounts are recognised in the Statement of Comprehensive Income when there is objective evidence that the asset is impaired. Significant financial difficulties of the debtor, probability that the debtor will enter bankruptcy or financial reorganisation, and default or delinquency in payments are considered indicators that the trade receivable is impaired. The allowance recognised is measured at the carrying amount.

The carrying amount of the asset is reduced through the use of an allowance account, and the amount of the loss is recognised in the Statement of Comprehensive Income within operating expenses. When a trade receivable is uncollectable, it is written off against the allowance account for trade receivables. Subsequent recoveries of amounts previously written off are credited against operating expenses in the Statement of Comprehensive Income.

Trade and other payables

Trade payables are initially measured at fair value, and are subsequently measured at amortised cost, using the effective interest rate method.

Cash and cash equivalents

Cash and cash equivalents comprise cash-on-hand and demand deposits, and other short-term highly liquid investments that are readily convertible to a known amount of cash and are subject to an insignificant risk of changes in value. These are initially and subsequently recorded at fair value.

Derivatives

The Group does not use derivative financial instruments including forward rate agreements and forward exchange contracts to hedge exposure rate and foreign fluctuations. It is the Group's policy not to hedge its exposure from foreign currency fluctuations, as it does not consider the impact to be significant. It is the policy of the Group not to trade in derivative financial instruments for speculative purposes.

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1.6 Investments

Investments consist of short-term money market instruments initially recorded at cost, which is the fair value of the cash placed with the institution. These investments are surplus funds which are classified as held-to-maturity financial assets. Interest is accrued using the effective interest rate method and included in the Statement of Comprehensive Income on an accrual basis.

1.7 Taxation

Current tax assets and liabilities

Current tax for current and prior periods is, to the extent unpaid, recognised as a liability. If the amount already paid in respect of current and prior periods exceeds the amount due for those periods, the excess is recognised as an asset.

Current tax liabilities/(assets) for the current and prior periods are measured at the amount expected to be paid to/ (recovered from) the tax authorities, using the tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period.

The company is exempt from paying Income Tax in terms of section 10(1) cA(i) of the Income Tax Act no.58 of 1962, but registered for VAT. Mindev is registered for Income Tax.

The tax currently payable is based on taxable profit for the financial year. Mindev's liability for current tax is calculated using tax rates that have been enacted or substantively enacted at the financial year end date.

1.8 Irregular, fruitless and wasteful expenditure

Irregular expenditure means expenditure incurred in contravention of, or not in accordance with, a requirement of any applicable legislation, including:

- The Public Finance Management Act; or,
- Any provincial legislation providing for procedures in that state owned entity.

Fruitless and wasteful expenditure means expenditure that was made in vain and could have been avoided had reasonable care been exercised. All irregular, fruitless and wasteful expenditure is charged against income in the period in which they are incurred.

1.9 Financing costs

Interest in Mintek arises from bank overdraft, creditors and post retirement medical aid liability. Financing costs are recognised in the statement of comprehensive income in the period in which they are incurred.

1.10 Leases

A lease is classified as a finance lease if it transfers substantially all the risks and rewards incidental to ownership. A lease is classified as an operating lease if it does not transfer substantially all the risks and rewards incidental to ownership.

Finance leases – lessee

Finance leases are recognised as assets and liabilities in the Statement of Financial Position at amounts equal to the fair value of the leased property or, if lower, the present value of the minimum lease payments. The corresponding liability to the lessor is included in the Statement of Financial Position as a finance lease obligation.

The discount rate used in calculating the present value of the minimum lease payments is the company's incremental borrowing rate.

The lease payments are apportioned between the finance charge and reduction of the outstanding liability. The finance charge is allocated to each period during the lease term so as to produce a constant periodic rate on the remaining balance of the liability.

Operating leases - lessor

Operating lease income is recognised as an income on a straight-line basis over the lease term.

Initial direct costs incurred in negotiating and arranging operating leases are added to the carrying amount of the leased asset and recognised as an expense over the lease term on the same basis as the lease income.

Income for leases is disclosed under other operating income in the Statement of Comprehensive Income.

Operating leases – lessee

Operating lease payments are recognised as an expense on a straight-line basis over the lease term. The difference between the amounts recognised as an expense and the contractual payments are recognised as an operating lease asset. This liability is not discounted.

1.11 Inventories

Inventories are measured at the lower of cost and net realisable value on the weighted average cost method.

Net realisable value is the estimated selling price in the ordinary course of business less the estimated costs of completion and the estimated costs necessary to make the sale. The cost of inventories comprises of all costs of purchase, costs of conversion and other costs incurred in bringing the inventories to their present location and condition.

The cost of inventories of items that are not ordinarily interchangeable and goods or services produced and segregated for specific projects is assigned using specific identification of the individual costs.

When inventories are sold, the carrying amounts of those inventories are recognised as an expense in the period in which the related revenue is recognised. The amount of any write-down of inventories to net realisable value and all losses of inventories are recognised as an expense in the period the write-down or loss occurs. The amount of any reversal of any write-down of inventories, arising from an increase in net realisable value, are recognised as a reduction in the amount of inventories recognised as an expense in the period in which the reversal occurs.

1.12 Impairment of assets

The group assesses at each end of the reporting period whether there is any indication that an asset may be impaired. If any such indication exists, the group estimates the recoverable amount of the asset.

Irrespective of whether there is any indication of impairment, the group also:

• tests intangible assets with an indefinite useful life or intangible assets not yet available for use for impairment annually by comparing its carrying amount with its recoverable amount. This impairment test is performed annually.

If there is any indication that an asset may be impaired, the recoverable amount is estimated for the individual asset. If it is not possible to estimate the recoverable amount of the individual asset, the recoverable amount of the cash-generating unit to which the asset belongs is determined.

The recoverable amount of an asset or a cash-generating unit is the higher of its fair value less costs to sell and its value in use.

If the recoverable amount of an asset is less than its carrying amount, the carrying amount of the asset is reduced to its recoverable amount. That reduction is an impairment loss.

An impairment loss of assets carried at cost less any accumulated depreciation or amortisation is recognised immediately in profit or loss. Any impairment loss of a revalued asset is treated as a revaluation decrease.



The company assesses at each reporting date whether there is any indication that an impairment loss recognised in prior periods for assets may no longer exist or may have decreased. If any such indication exists, the recoverable amounts of those assets are estimated.

A reversal of an impairment loss of assets carried at cost less accumulated depreciation or amortisation other than goodwill is recognised immediately in the Statement of Comprehensive Income. Any reversal of an impairment loss of a revalued asset is treated as a revaluation increase.

1.13 Share capital and equity

An equity instrument is any contract that evidences a residual interest in the assets of an entity after deducting all of its liabilities.

1.14 Employee benefits

Defined contribution plans

Payments to defined contribution retirement benefit plans are charged as an expense as they fall due.

Payments made to retirement benefit schemes are dealt with as defined contribution plans where the group's obligation under the schemes is equivalent to those arising in a defined contribution retirement benefit plan.

For defined contribution plans, the Group pays contribution to privately administered pension insurance plans on a contractual basis. The Group has no further payment obligations once the contributions have been paid. The contributions are recognised as employee benefit expense when they are due.

Defined benefit plans

Actuarial valuations are conducted on an annual basis by independent actuaries separately for each plan.

Actuarial gains and losses are recognised in full in the reporting period it relates to and is the excess over the greater of the present value of the past service obligation at the reporting period before deducting the present value of assumed assets at the same date.

Valuations of these obligations are carried out annually by independent, qualified actuaries using the appropriate mortality tables, long-term estimates of increases in medical costs and appropriate discount rates.

Consideration is given to any event that could impact the

funds up to the end of the reporting period where the interim valuation is performed at an earlier date.

Past service costs are recognised immediately to the extent that the benefits are already vested, and are otherwise amortised on a straight line basis over the average period until the amended benefits become vested.

The liability recognised in the Statement of Financial Position in respect of the defined benefit pension plans is the present value of the defined obligation at the Statement of Financial Position date less the fair value of plan assets, together with adjustments for unrecognised past-service costs. The defined benefit obligation is calculated annually by independent actuaries using the projected unit credit method.

Prepaid contributions are recognised as an asset to the extent that a cash refund or a reduction in the future payment is available.

The Group has an obligation to fund the medical aid benefits of all its past employees and dependents of past employee who retired or were in the employment of the Group prior to 1 January 2000. The plan liability is unfunded and fully provided for in the financial statements. The Group uses the projected unit credit actuarial method to determine the present value of its past service cost. General increases to medical aid contributions were estimated taking into account the projected future changes in the cost of medical services resulting from both inflation and specific changes to medical costs.

1.15 Provisions and contingencies

Provisions are recognised when:

- the group has a present obligation as a result of a past event;
- it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation; and
- a reliable estimate can be made of the obligation.

The amount of a provision is the present value of the expenditure expected to be required to settle the obligation.

Where some or all of the expenditure required to settle a provision is expected to be reimbursed by another party, the reimbursement shall be recognised when, and only when, it is virtually certain that reimbursement will be received if the entity settles the obligation. The reimbursement shall be treated as a separate asset. The amount recognised for the reimbursement shall not exceed the amount of the provision.

Provisions are not recognised for future operating losses.

If the company has a contract that is onerous, the present obligation under the contract shall be recognised and measured as a provision.

After their initial recognition contingent liabilities recognised in business combinations that are recognised separately are subsequently measured at the higher of:

- the amount that would be recognised as a provision; and
- the amount initially recognised less cumulative amortisation.

Contingent assets and contingent liabilities are not recognised. Contingencies are disclosed in note 24.

1.16 Government grants

Government grants are recognised at fair value when there is reasonable assurance that:

- the group will comply with the conditions attaching to them; and
- the grants will be received.

Government grants are recognised as income over the periods necessary to match them with the related costs that they are intended to compensate.

A government grant that becomes receivable as compensation for expenses or losses already incurred or for the purpose of giving immediate financial support to the entity with no future related costs is recognised as income of the period in which it becomes receivable.

Government grants related to assets, including nonmonetary grants at fair value, are presented in the Statement of Financial Position by setting up the grant as deferred income or by deducting the grant in arriving at the carrying amount of the asset.

Grants related to income are presented as a credit in the Statement of Comprehensive Income (separately).

Where a loan is received from government at below market interest rate, the difference between the fair value of the loan

ACCOUNTING POLICIES AS AT 31 MARCH 2016

and the amount received is recognised as a government grant.

1.17 Revenue

Revenue from the sale of goods is recognised when all the following conditions have been satisfied:

- the group has transferred to the buyer the significant risks and rewards of ownership of the goods;
- the group retains neither continuing managerial involvement to the degree usually associated with ownership nor effective control over the goods sold;
- the amount of revenue can be measured reliably;
- it is probable that the economic benefits associated with the transaction will flow to the group; and
- the costs incurred or to be incurred in respect of the transaction can be measured reliably.

When the outcome of a transaction involving the rendering of services can be estimated reliably, revenue associated with the transaction is recognised by reference to the stage of completion of the transaction at the end of the reporting period. The outcome of a transaction can be estimated reliably when all the following conditions are satisfied:

- the amount of revenue can be measured reliably;
- it is probable that the economic benefits associated with the transaction will flow to the group;
- the stage of completion of the transaction at the end of the reporting period can be measured reliably; and
- the costs incurred for the transaction and the costs to complete the transaction can be measured reliably.

When the outcome of the transaction involving the rendering of services cannot be estimated reliably, revenue shall be recognised only to the extent of the expenses recognised that are recoverable.

Service revenue is recognised by reference to the stage of completion of the transaction at the end of the reporting period. Stage of completion is determined by the actual costs in relation to the planned cost of a project.

Service fees included in the price of the product are recognised as revenue over the period during which the service is performed.

Contract revenue comprises:

• the initial amount of revenue agreed in the contract;

and

- variations in contract work, claims and incentive payments:
 - to the extent that it is probable that they will result in revenue; and
 - they are capable of being reliably measured.

Revenue is measured at the fair value of the consideration received or receivable and represents the amounts receivable for goods and services provided in the normal course of business, net of trade discounts and volume rebates, and value added tax.

Interest is recognised, in the Statement of Comprehensive Income, using the effective interest rate method.

1.18 Translation of foreign currencies

Foreign currency transactions

A foreign currency transaction is recorded, on initial recognition in Rand, by applying to the foreign currency amount the spot exchange rate between the functional currency and the foreign currency at the date of the transaction.

At the end of the reporting period:

- foreign currency monetary items are translated using the closing rate;
- non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rate at the date of the transaction; and
- non-monetary items that are measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined.

Exchange differences arising on the settlement of monetary items or on translating monetary items at rates different from those at which they were translated on initial recognition during the period or in previous financial statements are recognised in profit or loss in the period in which they arise.

Cash flows arising from transactions in a foreign currency are recorded in Rand by applying to the foreign currency amount the exchange rate between the Rand and the foreign currency at the date of the cash flow.



2. Property, plant and equipment

Figures In Rand	2016			2015				
	Cost Valuation	Accumulated Depreciation	Carrying Value	Cost Valuation	Accumulated Depreciation	Carry Value		
Land	112 334 241	-	112 334 241	91 747 897	-	91 747 897		
Buildings	91 686 170	(26 466 190)	65 219 980	89 236 382	(24 627 271)	64 609 111		
Plant and machinery	32 604 363	(27 240 651)	5 363 712	32 615 815	(25 968 794)	6 647 021		
Furniture and fixtures	7 669 424	(4 718 254)	2 951 170	6 648 543	(4 028 888)	2 619 655		
Motor vehicles	7 330	(7 185)	145	7 330	(7 256)	74		
Equipment	350 733 149	(312 946 079)	37 787 070	315 986 976	(285 244 486)	30 742 490		
Capital assets under construction	6 519 053	-	6 519 053	11 193 988	-	11 193 988		
Total	601 553 730	(371 378 359)	230 175 371	547 436 931	(339 876 695)	207 560 236		

Reconciliation of the carrying value of property, plant and equipment - Group and Mintek - 2016

	Opening balance	Additions	Disposals	Funded Assets	Transfers	Revaluations	Adjustments	Depreciation	Total
Land	91 747 897	-	-	-	-	20 586 344	-	-	112 334 241
Buildings	64 609 111	-	(471 762)	-	-	3 076 348	-	(1 993 717)	65 219 980
Plant and machinery	6 647 021	-	(3 310)	-	-	-	126 837	(1 406 836)	5 363 712
Furniture and fixtures	2 619 655	1 150 707	(17 595)	-	-	-	255 616	(1 057 213)	2 951 170
Motor vehicles	74	-	-	-	-	-	145	(74)	145
Equipment	30 742 490	36 938 640	(856 087)	(23 498 881)	2 670 788	-	1 983 027	(10 192 907)	37 787 070
Capital assets under construction	11 193 988	20 965 222	-	(22 969 369)	(2 670 788)	-	-	-	6 519 053
	207 560 236	59 054 569	(1 348 754)	(46 468 250)	-	23 662 692	2 365 625	(14 650 747)	230 175 371

Reconciliation of the carrying value of property, plant and equipment - Group and Mintek - 2015

	Opening balance	Additions	Disposals	Funded Assets	Transfers	Adjustments	Depreciation	Total
Land	91 747 897	-	-	-	-	-	-	91 747 897
Buildings	66 613 459	-	-	-	-	-	(2 004 348)	64 609 111
Plant and machinery	7 654 521	436 573	(6 538)	-	79 146	997 526	(2 514 207)	6 647 021
Furniture and fixtures	2 389 855	777 849	(14 775)	-	-	316 791	(850 065)	2 619 655
Motor vehicles	55 206	-	-	-	-	-	(55 132)	74
Equipment	42 532 559	22 245 317	(281 898)	(24 817 582)	(3 640 754)	3 421 928	(8 717 080)	30 742 490
Capital assets under construction	2 079 851	13 567 580	-	(8 015 051)	3 561 608	-	-	11 193 988
	213 073 348	37 027 319	(303 211)	(32 832 633)	-	4 736 245	(14 140 832)	207 560 236

Other information

Details of properties

Funding received during the current financial year for the purchase of assets is R46,468,250 (R32,832,633 for 2015). Capital assets under construction relates to the construction of plants and the renovation of buildings. These assets were under construction at year-end and are not ready for use yet. A register containing the information required by Regulation 25(3) of the Companies Regulations, 2011 is available for inspection at the registered office of the company. Funded assets with a total acquisition value of R256,931,529 (2015 - R235,405,996) are still in use.

Mintek reassessed the useful life of all zero value assets due to the fact that they are still in use and have future economic value. The useful lives were extended based on the assumptions that assets will be replaced in the next two years due to a capitalisation plan. The original acquisition value for these assets were R12,442,777 and the resultant depreciation write back was R2,728,171 of which R2,365,625 relates to property, plant and equipment and R362,546 relates to intangible assets (refer to note 20).

2. Property, plant and equipment (continued)

	MINTEK	GROUP	MINTEK		
Figures In Rand	2016	2015	2016	2015	
Carrying value					
Land	112 334 241	91 747 897	112 334 241	91 747 897	
Buildings	65 219 980	64 609 111	65 219 980	64 609 111	
Plant	5 363 712	6 647 021	5 363 712	6 647 021	
Equipment	37 787 070	30 742 490	37 787 070	30 742 490	
Vehicles	145	74	145	74	
Furniture and fittings	2 951 170	2 619 655	2 951 170	2 619 655	
Capital work in progress	6 519 053	11 193 988	6 519 053	11 193 988	
	230 175 371	207 560 236	230 175 371	207 560 236	
Freehold land and buildings at costs:					
Land and buildings original cost	11 759 900	11 759 900	11 759 900	11 759 900	
Revaluation until 31 March 2006	75 373 132	75 373 132	75 373 132	75 373 132	
Revaluation 31 March 2008	49 324 836	49 324 836	49 324 836	49 324 836	
Additions and transfers 2009	3 068 180	3 068 180	3 068 180	3 068 180	
Additions and transfers 2010	12 401 768	12 401 768	12 401 768	12 401 768	
Additions and transfers 2011	882 252	882 252	882 252	882 252	
Revaluation 31 March 2011	24 485 158	24 485 158	24 485 158	24 485 158	
Additions and disposals 2012	1 088 371	1 088 371	1 088 371	1 088 371	
Additions 2013	2 600 682	2 600 682	2 600 682	2 600 682	
Revaluation and disposal 31 March 2016	23 036 132	-	23 036 132	-	
Revaluation at cost	204 020 411	180 984 279	204 020 411	180 984 279	
Directors' valuation	204 020 411	180 984 279	204 020 411	180 984 279	

Portion 175 and portion 226 of the farm Klipfontein, 203-IQ Johannesburg, with buildings thereon and the sectional title of units at Malanshof Heights located at Erf 560 Malanshof. The value of the land and building complexes were estimated at R204,020,411 by Resurgent Projects (Pty) Ltd, an independent valuator, during the financial year ending 31 March 2016. The valuation is done every 5 years and the latest valuation report was issued on 18 April 2016. The key assumptions used were that the value of the property be based as sale of vacant land and buildings for rental investment using various rental income figures for different areas of the Mintek property. These calculated rentals were then capitalised at 13.5%.

The estimated useful lives of depreciable property, plant, equipment and vehicles are as follows:

Item	Average useful life
Buildings	50 years
Plant	5 - 10 years
Equipment	5 - 10 years
Computer Equipment	3 - 5 years
Vehicles	5 years
Furniture and fittings	5 - 10 years



3. Intangible assets

		MINTEK GR	OUP AND MINTEK				
Figures In Rand		2016			2015		
	Cost	Accumulated amortisation	Carrying value	Cost	Accumulated amortisation	Carrying value	
Computer software	6 155 448	(4 435 372)	1 720 076	5 513 992	(4 063 510)	1 450 482	
Reconciliation of intangible assets - Mintek Group and Mintek - 2016							
	Opening balance	Additions	Disposals	Adjustments	Amortisation	Total	
Computer software	1 450 482	641 456	-	362 546	(734 408)	1 720 076	
Reconciliation of intangible assets - Mintek Group and Mintek - 2015							
	Opening balance	Additions	Disposals	Adjustments	Amortisation	Total	
Computer software	2 390 352	126 607	(255 495)	235 402	(1 046 384)	1 450 482	

The estimated useful lives of amortisable intangible assets are as follows: 3 - 5 years

4. Interests in subsidiaries including consolidated structured entities

		MINTEK	GROUP	MINTEK		
Figures In Rand		2016	2015	2016	2015	
Name of company	Held by	% holding	% holding	Carrying amount	Carrying amount	
Mindev (Pty) Ltd	Mintek	100	100	100	100	

Mindev is engaged in the commercialization of Mintek's patents and technology through the identification of suitable partners to advance such interests by way of direct investment in equity and through joint ventures.

Mintek holds 100% of the issued share capital of Mindev (Propriety) Limited. The carrying amounts of the subsidiary is shown net of impairment losses.

5. Inventories

	MINTEK	GROUP	MINTEK	
Figures In Rand	2016	2015	2016	2015
Consumables	5 512 314	4 780 586	5 512 314	4 780 586
Finished goods	1 097 971	541 794	1 097 971	541 794
Work-in-progress	409 350	194 382	409 350	194 382
	7 019 635	5 516 762	7 019 635	5 516 762
Provision for obsolete inventories	(17 211)	-	(17 211)	-
	7 002 424	5 516 762	7 002 424	5 516 762
Carrying value of inventories carried at fair value less costs to sell	7 002 424	5 516 762	7 002 424	5 516 762

Consumables are held in stock for daily business requirements. Finished goods relate to products manufactured by the MAC division.

6. Trade and other receivables

	MINTEK GROUP		MINTEK	
Figures In Rand	2016	2015	2016	2015
Trade receivables	21 947 238	32 784 364	21 947 238	32 784 364
SARS - VAT	1 729 455	1 462 658	1 729 455	1 462 658
Prepayments	4 096 802	1 225 410	4 096 802	1 225 410
Unearned interest on fair value debtors (discounting)	59 714	124 908	59 714	124 908
Project work in progress	12 490 077	17 154 825	12 490 077	17 154 825
Other receivables	280 174	285 339	280 174	285 339
Less: Provision for doubtful debts	(295 848)	(198 255)	(295 848)	(198 255)
	40 307 612	52 839 249	40 307 612	52 839 249

Project work-in-progress relates to projects where work has been executed, but not yet billed.

Age analysis

The following is an age analysis of trade receivables at balance sheet date:

	21 947 238	32 784 364	21 947 238	32 784 364
90+ days past due	2 129 104	568 226	2 129 104	568 226
61-90 days past due	495 690	261 470	495 690	261 470
31-60 days past due	2 851 363	2 399 666	2 851 363	2 399 666
0-30 days	16 471 081	29 555 002	16 471 081	29 555 002

The age analysis reflects the categories of overdue debtors.

Fair value of trade receivables

Trade and other receivables	40 307 612	52 839 249	40 307 612	52 839 249		
In terms of IAS 39 outstanding customer invoices are discounted throughout the year to show the deemed interest that Mintek has forfeited. An effective						

interns of IAS 39 outstanding customer invoices are discounted throughout the year to show the deemed interest that Mintek has forfeited. An ene interest that been used due to the fact that this is a fair representation of the interest that Mintek earns through liquid deposits.

Provision for impairment

Included in the trade receivable balance are debtors which are past the original expected collection date at the reporting date, with a carrying amount of R2,624,794 (2015: R631,441) for which the company has not provided as there has not been a significant change in credit quality and the amounts are still considered recoverable. The company does not hold any collateral over these balances. The average age of outstanding balances is 52 days (2015: 54 days). A summarised age analysis of due debtors is set out below.

The ageing of amounts due but not impaired is as follows:				
60 - 90 days	495 690	261 470	495 690	261 470
More than 90 days	1 833 256	369 971	1 833 256	369 971
	2 328 946	631 441	2 328 946	631 441

Trade and other receivables impaired

The amount of the provision was R295,848, of which R237,213 relates to staff debts, as at 31 March 2016 (2015:R198,255). An amount of R246,544 (2015:R75,000) was written-off as bad debts directly to the Statement of Comprehensive Income during the year under review. The ageing of these trade receivables is as follows:

, , , , , , , , , , , , , , , , , , , ,				
More than 90 days	295 848	198 255	295 848	198 255
Reconciliation of provision for impairment of trade receivables				
Opening balance	198 255	185 464	198 255	185 464
Provision for impairment	-	198 255	-	198 255
Amounts settled	(139 620)	(185 464)	(139 620)	(185 464)
Provision for impairment - Staff debts	237 213	-	237 213	-
	295 848	198 255	295 848	198 255

In determining the receivable from the date credit was initially granted up to the reporting date. Accordingly, the directors believe that there is no further credit provision required in excess of the provision for doubtful debts.

The maximum exposure to credit risk at the reporting date is the fair value of each class of receivable. The group does not hold any collateral as security.



6. Trade and other receivables (Continued)

	MINTEK GROUP		MINTEK	
	2016	2015	2016	2015
Currencies				
The carrying amount of trade receivables are denominated in the following currencies				
ZAR	20 053 572	27 818 872	20 053 572	27 818 872
USD	1 016 539	4 500 293	1 016 539	4 500 293
EUR	425 514	258 752	425 514	258 752
AUD	451 613	206 447	451 613	206 447
	21 947 238	32 784 364	21 947 238	32 784 364

7. Short term investments

	MINTEK GROUP		MINTEK	
Figures In Rand	2016	2015	2016	2015
Short term investments - Current Portion	457 658 378	437 848 120	457 658 378	437 848 120

Investments in short-term fixed deposits are held with various reputable financial institutions at market value and interest has been earned at prime overdraft rates less a varied percentage over the year.

Fixed investments held with various financial institutions are partly earmarked for the financing of Mintek's liabilities. A cession of R 2,155,000 (2015: R2,155,000) is held over these investments. Refer to note 25.

8. Retirement benefits

	MINTEK	GROUP	MINT	ΈK
Figures In Rand	2016	2015	2016	2015
Carrying value				
Post-retirement medical aid	26 284 506	29 405 623	26 284 506	29 405 623
Number of employees	92	102	92	102
Post-retirement medical benefits				

Medical cover is provided through a number of different schemes. Post-retirement medical cover in respect of qualifying employees is recognised as an expense over the expected remaining service lives of the relevant employees. Mintek has an obligation to provide medical benefits to certain pensioners and dependents. These liabilities have been provided for in full, calculated on an actuarial basis. These liabilities are unfunded. Periodic valuation of this obligation is carried out by an independent actuary every year, the latest one being 31 March 2016.

The amounts included in the balance sheet arising from Mintek's obligation in respect of post-retirement medical benefits are as follows:

Present value of obligations as at 31 March 2016				
	26 284 506	29 405 623	26 284 506	29 405 623

8. Retirement benefits (Continued)

	MINTEK	GROUP MINT		MINTEK	
Figures In Rand	2016	2015	2016	2015	
Post-retirement medical benefit obligation					
Fixed investment held with various financial institutions is partly earmarked as financing for pos aid liability.	t-retirement medical aid liab	vility. Mintek has not assigne	ed a specific fund to hedge the	he post-retirement medical	
Movement in the net liability recognised in the statement of financial position					
Net-past service benefit liability: Beginning of the year	29 405 623	29 387 260	29 405 623	29 387 260	
Interest costs	2 400 000	2 400 000	2 400 000	2 400 000	
Contributions paid to service providers	(158 058)	(140 799)	(158 058)	(140 799)	
Net actuarial (gain)/loss	(3 352 389)	1 388 920	(3 352 389)	1 388 920	
Settlements	(2 010 670)	(3 629 758)	(2 010 670)	(3 629 758)	
Net-past services benefit liability: End of the year	26 284 506	29 405 623	26 284 506	29 405 623	
Key assumptions					
Discount rate	10.30 %	8.50 %	10.30 %	8.50 %	
Expected increase in medical inflation	8.70 %	7.20 %	8.70 %	7.20 %	
Amounts recognised in the statement of comprehensive income are as follows:					
Current Costs	2 400 000	2 400 000	2 400 000	2 400 000	
Benefits paid					
Contributions paid	158 058	140 799	158 058	140 799	
The results are dependent on the assumptions used. The table below shows how the past se	rvice cost as at 31 March 2	016 would be impacted by	changes to these assumptio	ns.	
Sensitivity analysis on past service cost					
Discount rate increased by 1% p.a.	23 484 506	25 705 623	23 484 506	25 705 623	
Discount rate decreased by 1% p.a.	29 784 506	33 905 623	29 784 506	33 905 623	
Subsidy inflation increased by 1% p.a.	29 584 506	33 805 623	29 584 506	33 805 623	
Subsidy inflation decreased by 1% p.a.	23 484 506	25 705 623	23 484 506	25 705 623	
Retirement age 58	27 584 506	30 905 623	27 584 506	30 905 623	

9. Loans from group companies

	MINTEK	GROUP	MINT	ГЕК
Figures In Rand	2016	2015	2016	2015
Subsidiaries				
Mindev (Pty) Ltd	-	-	39 515 043	39 515 043

The loans granted are unsecured and do not have fixed repayment terms.

The carrying amount of the loan to Mintek is denominated in Rands.



10. Trade and other payables

	MINTEK GROUP		MINTEK	
Figures In Rand	2016	2015	2016	2015
Trade payables	26 234 966	21 071 519	26 234 966	21 071 519
Other payables	10 377 754	8 415 876	10 377 754	8 415 876
Incentive bonus	7 500 000	13 000 000	7 500 000	13 000 000
Accrued leave pay	9 587 161	10 487 935	9 587 161	10 487 935
Accruals	13 402 390	11 266 896	13 402 390	11 266 896
Unpaid interest - creditors	32 539	108 471	32 539	108 471
	67 134 810	64 350 697	67 134 810	64 350 697
Fair value of trade and other pavables				
Trade and other payables	67 134 810	64 350 697	67 134 810	64 350 697

In terms of IAS 39 outstanding supplier invoices are discounted throughout the year to show the deemed interest that Mintek has forfeited. An effective interest rate has been used due to the fact that this is a fair representation of the interest that Mintek earns through liquid deposits.

11. Deferred income

	MINTEK GROUP		MINTEK	
Figures In Rand	2016	2015	2016	2015
Deferred income	159 278 522	150 342 899	159 278 522	150 342 899
Advance client billing (Unearned income)	10 591 124	14 322 311	10 591 124	14 322 311
	169 869 646	164 665 210	169 869 646	164 665 210

Deferred income arises as a result of contracts undertaken for several government departments and institutions in respect of amounts received in cash not yet accounted for as revenue.

Advance client billing income arises as a result of contracts undertaken in terms of commercial work where invoices are raised based on work that has not been done. The quantum of costs incurred provides the basis for the level of revenue recognised in the period.

12. Provisions

Reconciliation of provisions - Group and Company - 2016	Opening balance	Additions Rever	sed during the year	Total
Product warranties	259 340	518 982	(259 340)	518 982
Reconciliation of provisions - Group and Company - 2015	Opening balance	Additions Rever	sed during the year	Total
Product warranties	618 526	259 340	(618 526)	259 340

The provision for product warranties arises from Mintek recognising its probable liability for meeting its obligation in terms of products and services as stipulated in its contracts with its customers.

13. Revenue

	MINTEK	GROUP	MINTEK		
Figures In Rand	2016	2015	2016	2015	
Components of revenue					
Government grants	295 526 056	232 565 451	295 526 056	232 565 451	
State Grant	363 808 772	325 310 526	363 808 772	325 310 526	
Prior year carry-over	136 217 510	84 884 755	136 217 510	84 884 755	
Less:					
Portion of grant utilised to acquire fixed assets and set-off against infrastructure improvements	(59 614 463)	(41 412 320)	(59 614 463)	(41 412 320)	
Portion of grant carried over for committed fixed asset purchases and expenses	(144 885 763)*	(136 217 510) *	(144 885 763) [*]	(136 217 510) *	
Other revenue streams	191 677 191	234 087 920	191 677 191	234 087 920	
Products and services	149 477 982	182 166 414	149 477 982	182 166 414	
Contract research	42 199 209	51 921 506	42 199 209	51 921 506	
	487 203 247	466 653 371	487 203 247	466 653 371	

*Included in the carried over amount is R104 459 988 (2015: R100 459 266) that is ringfenced for specific projects relaring to the rehabilitation of derelict and ownerless mines, as agreed with the Department of Mineral Resources.

14. Other operating income

	MINTEK GROUP		MINTEK	
Figures In Rand	2016	2015	2016	2015
Components of operating income				
Library services	9 896	30 071	9 896	30 071
Breach of contract (employees)	851 459	379 211	851 459	379 211
Insurance claims received	806 850	6 008 119	806 850	6 008 119
Skill Development Levy refunds	222 477	-	222 477	-
Sundry income	2 295 823	1 381 471	2 295 823	1 381 471
Rental income - properties	2 574 302	2 337 850	2 574 302	2 337 850
	6 760 807	10 136 722	6 760 807	10 136 722

15. Investment income

	MINTEK GROUP		MINTEK	
Figures In Rand	2016	2015	2016	2015
Short term deposits	31 995 841	24 990 376	31 995 841	24 990 376
Bank balances	58 911	58 580	58 911	58 580
Fair value interest on debtors	776 932	1 434 194	776 932	1 434 194
Other interest	4 342	-	4 342	-
	32 836 026	26 483 150	32 836 026	26 483 150

Total interest income, calculated using the effective interest rate, on financial instruments not at fair value through the Statement of Comprehensive Income amounted to R32,836,026 (2015: R26,483,150).



16. Employee costs

	MINTEK GROUP		MINTEK	
Figures In Rand	2016	2015	2016	2015
Employee remuneration	273 201 870	267 714 813	273 201 870	267 714 813
Overtime	6 163 540	5 747 426	6 163 540	5 747 426
Provision for bonus expense	7 500 000	13 000 000	7 500 000	13 000 000
Training	5 342 128	7 544 262	5 342 128	7 544 262
Medical expenses	1 593 775	1 596 532	1 593 775	1 596 532
Accrued leave provision expense	3 959 763	5 666 457	3 959 763	5 666 457
Bursaries	12 931 345	15 573 952	12 931 345	15 573 952
Board member fees	386 056	382 188	386 056	382 188
Other employee costs	1 146 647	1 360 251	1 146 647	1 360 251
	312 225 124	318 585 881	312 225 124	318 585 881

17. Finance costs

	MINTEK	GROUP	МІМТ	EK
Figures In Rand	2016	2015	2016	2015
Trade creditors	5 290	24 585	5 290	24 585
Fair value interest on creditors	1 023 998	1 762 241	1 023 998	1 762 241
Retirement benefits	2 400 000	2 400 000	2 400 000	2 400 000
	3 429 288	4 186 826	3 429 288	4 186 826

18. Auditors remuneration

	MINTEK	GROUP	МІМТ	ΈK
Figures In Rand	2016	2015	2016	2015
External audit fees	2 396 679	1 682 532	2 396 679	1 682 532
Other audits	170 580	203 829	170 580	203 829
	2 567 259	1 886 361	2 567 259	1 886 361

19. Fees for services

	MINTEK	GROUP	МІМТ	ΈK
Figures In Rand	2016	2015	2016	2015
*Components of fees for services				
Technology services	16 606 634	19 780 926	16 606 634	19 780 926
Facility management	7 891 568	3 048 653	7 891 568	3 048 653
Legal fees	1 781 459	2 069 390	1 781 459	2 069 390
Contract services	649 294	619 322	649 294	619 322
Asbestos rehabilitation	58 685 225	23 741 406	58 685 225	23 741 406
Professional consultancy	5 038 962	4 969 995	5 038 962	4 969 995
	90 653 142	54 229 692	90 653 142	54 229 692

*The 2015 components have been restated to improve the disclosure of the items.

20. Depreciation, amortization and impairments

	MINTEK GROUP		MINT	ГЕК
Figures In Rand	2016	2015	2016	2015
Components of depreciation, amortization and impairments				
Buildings	1 993 717	2 004 348	1 993 717	2 004 348
Plant	1 406 836	2 514 207	1 406 836	2 514 207
Equipment	10 192 907	8 717 080	10 192 907	8 717 080
Vehicles	74	55 132	74	55 132
Furniture and fittings	1 057 213	850 065	1 057 213	850 065
Computer software (intangible assets)	734 408	1 046 384	734 408	1 046 384
	15 385 155	15 187 216	15 385 155	15 187 216
Reassessment of assets useful lives	(2 728 171)	(4 971 647)	(2 728 171)	(4 971 647)

Mintek reassessed the useful life of all zero value assets due to the fact that they are still in use and have future economic value. The useful lives were extended based on the assumptions that assets will be replaced in the next two years due to a capitalisation plan. The original acquisition value for these assets were R12,442,777 and the resultant depreciation write back was R2,728,171 (refer to note 2).

21. Taxation

	MINTEK G	ROUP	MINT	EK
Figures In Rand	2016	2015	2016	2015
Reconciliation of the tax expense				
Reconciliation between applicable tax rate and average effective tax rate.				
Applicable tax rate	28.00 %	28.00 %	-	-

No provision for income tax was made for the company during the current financial year as Mintek is exempt in terms of section 10(1)(CA)(i) of the Income Tax Act, No.58 of 1962; and Mindev is a dormant company. Tax provisions and liabilities are with respect to Mindev and are payable through those entities.



22. Cash generated from operations

	MINTEK	GROUP	MINT	ΈK
Figures In Rand	2016	2015	2016	2015
Surplus for the year	13 796 588	17 609 707	13 796 588	17 609 707
Adjustments for:				
Depreciation and amortisation	15 385 155	15 187 216	15 385 155	15 187 216
Loss on sale of assets	788 754	558 706	788 754	558 706
Actuarial (gains)/losses	(3 510 448)	1 248 121	(3 510 448)	1 248 121
Interest received - investment	(32 836 026)	(26 483 150)	(32 836 026)	(26 483 150)
Finance costs	3 429 288	4 186 826	3 429 288	4 186 826
Fair value adjustment - trade receivables	776 932	1 434 194	776 932	1 434 194
Fair value adjustment - trade payables	(1 023 998)	(1 762 242)	(1 023 998)	(1 762 242)
Assets adjustment	(2 728 171)	(4 971 647)	(2 728 171)	(4 971 647)
Changes in working capital:				
Increase in inventories	(1 485 662)	(1 025 272)	(1 485 662)	(1 025 272)
Decrease in trade and other receivables	12 531 637	2 166 013	12 531 637	2 166 013
Increase in trade and other payables	2 784 113	7 439 484	2 784 113	7 439 484
Increase in deferred income	5 204 436	41 377 102	5 204 436	41 377 102
Increase/(decrease) in provisions	259 642	(359 186)	259 642	(359 186)
	13 372 240	56 605 872	13 372 240	56 605 872

23. Insurance and Risk Management

The insurance and risk management policies adopted by Mintek are aimed at obtaining sufficient cover at the minimum cost to protect its asset base, earning capacity and legal obligations against acceptable losses.

All property, plant and equipment are insured at current replacement value. Risks of a possible catastrophic nature are identified and insured at acceptable risks.

24. Commitments

	MINTEK	GROUP	MINT	EK
Figures In Rand	2016	2015	2016	2015
Authorised capital expenditure				
Authorised and contracted for				
Property, plant and equipment	14 361 764	5 751 675	14 361 764	5 751 675
This committed expenditure relates to plant and equipment and will be financed by available,				
existing cash resources, external grant funding.				
Operational expenditure				
Contracted for	34 127 573	48 006 044	34 127 573	48 006 044
Operating leases for vehicles – as lessee (expense)				
Minumum Lease payments due				
- within one year	639 004	228 986	639 004	228 986
- in second to fifth year inclusive	769 677	123 621	769 677	123 621
	1 408 681	352 607	1 408 681	352 607

25. Contingencies

Mintek has disputed employment contracts with former employees, the aggregate of which is not expected to exceed R355,915 (2015: R355,915). This amount includes estimated legal costs and disbursements and does not factor the success rate of the individual cases.

Cessions in favour of Absa Bank for R2,155,000 (2015: R2,155,000) to meet requirements for credit card and other banking facilities has been registered.

26. Related parties

	MINTEK	GROUP	MINT	EK
Figures In Rand	2016	2015	2016	2015

Controlling entity

The Group comprises of Mintek and its wholly owned subsidiary Mindev (Proprietary) Limited. Mindev is engaged in the commercialisation of Mintek patents and technology through the identification of suitable partners. The Group, in the ordinary course of business, enters into various sale and purchase transactions with related parties.

None of the directors, officers or major shareholders of the Mintek Group or, to the knowledge of Mintek, their families, had any interest, direct or indirect, in any transactions which has affected or will materially affect Mintek or its investment or subsidiary.

Related party transactions

Related party transactions exist within the Group. During the year all sales transactions were concluded at arm's length. Details of material transactions with related parties not disclosed elsewhere in the financial statements are as follows:

Related party balances				
Loan accounts - Owing to related parties				
Mindev (Pty) Ltd	-	-	39 515 043	39 515 043
Amounts included in Deferred Income regarding related parties				
Department of Mineral Resources	144 885 763	136 217 510	144 885 763	136 217 510
Mining Qualification Authority	1 169 196	1 052 551	1 169 196	1 052 551
Department of Science and Technology	11 176 167	8 218 941	11 176 167	8 218 941
National Research Foundation	1 257 923	4 064 424	1 257 923	4 064 424
Technology Innovation Agency	789 474	789 474	789 474	789 474
Amounts included in Trade receivables regarding related parties				
Mining Qualification Authority	1 713 470	1 094 061	1 713 470	1 094 061
Water Research Council	443 026	1 000 000	443 026	1 000 000
Department of Science and Technology	78 766	913 978	78 766	913 978
National Research Foundation	-	2 511 693	-	2 511 693
Minquiz Sponsorship	-	20 000	-	20 000
Technology Innovation Agency	717 816	717 816	717 816	717 816
Sales to related parties				
Department of Mineral Resources	289 564 658	230 410 106	289 564 658	230 410 106
Department of Science and Technology	39 033 208	44 022 045	39 033 208	40 022 045
National Research Foundation	1 758 806	572 296	1 758 806	572 296
Council of Geoscience	10 975	-	10 975	-
Technology Innovation Agency	-	39 377	-	39 377
Mining Qualification Authority	5 270 556	7 724 820	5 270 556	7 724 820
Water Research Council	1 165 857	877 193	1 165 857	877 193
The South African Medical Research Council	170 192	-	170 192	-



26. Related parties (Continued)

Relationships	
Subsidiary	Mindev (Pty) Limited
Parent National Department	Department of Mineral Resources
Other Government Science Departments	Department of Science and Technology and its Entities
Other Government Departments and Entities	Department of Health and its Entities
	Department of Higher Education and Training and its Entities

Department of Water and Sanitation and its Entities

27. Board members and executive management remuneration

2016			
Executive Management	Basic salary (R)	Performance bonuses and other expenses	Total
Mr MA Mngomezulu	2 755 372	267 484	3 022 856
Mr AD McKenzie	1 672 194	138 364	1 810 558
Mr P Craven	1 770 119	175 391	1 945 510
Mr SA Simelane	1 836 915	171 169	2 008 084
Ms FG Nyanda	1 608 216	117 363	1 725 579
Dr M Makhafola	1 672 194	215 215	1 887 409
Ms DR Bopape (Resigned 16/07/2015)	440 664	20 578	461 242
	11 755 674	1 105 564	12 861 238

Non-Executive Board members

	Entity	Fees for services as directors	Other expenses	Total
Adv L Makatini	Independent Management Consultant	77 928	-	77 928
Ms ND Zikalala	De Beers Group	43 336	-	43 336
Adv D Block	Independent Management Consultant	82 376	8 438	90 814
Dr V Toni Penxa	IMS Labs	69 384	9 963	79 347
Dr NS Nhlapo	Cape Peninsula University of Technology	35 584	-	35 584
Ms K Mthimunye	Independent Management Consultant	56 784	-	56 784
		365 392	18 401	383 793

	MINTEK GROUP		MINT	MINTEK	
Figures In Rand	2016	2015	2016	2015	
Travel	152 086	104 427	152 086	104 427	
Independent committee members - fees and travel costs	16 072	49 526	16 072	49 526	
Other expenses	13 547	36 730	13 547	36 730	
	181 705	190 683	181 705	190 683	

Mr. I Patel and Ms. C Leso were not paid any directors' emoluments during the year under review as they are serving as government employees.

27. Board members and executive management remuneration (Continued)

2015			
Executive Management	Basic salary (R)	Performance bonuses, labour costs and other expenses	Total
Mr MA Mngomezulu	2 564 678	68 869	2 633 547
Mr AD McKenzie	1 556 464	77 974	1 634 438
Mr P Craven	1 647 612	77 702	1 725 314
Mr SA Simelane	1 709 786	36 427	1 746 213
Ms FG Nyanda	1 496 915	19 868	1 516 783
Dr M Makhafola	1 556 464	131 226	1 687 690
Ms DR Bopape (Reinstated 01/12/2014)	492 358	5 787 901 *	6 280 259
	11 024 277	6 199 967	17 224 244

* This amount relates to settlements made in terms of a labour dispute.

Non-Executive Board members

	Entity	Fees for services as directors	Other expenses	Total
Adv L Makatini	Independent Management Consultant	69 124	-	69 124
Ms ND Zikalala	De Beers Group	40 346	-	40 346
Adv D Block	Independent Management Consultant	65 632	15 428	81 060
Prof FW Petersen (Resigned 29/09/2014)	University of Cape Town	21 920	-	21 920
Dr V Toni Penxa	IMS Labs	52 960	20 096	73 056
Dr NS Nhlapo	Cape Peninsula University of Technology	30 912	-	30 912
Ms K Mthimunye	Independent Management Consultant	51 768	-	51 768
		332 662	35 524	368 186



28. Financial Instruments

Foreign currency risk

Foreign currency risk is the risk that the fair value or future cash flow of a financial instrument will fluctuate because of changes in foreign exchange rates. The group undertakes certain transactions denominated in foreign currencies hence exposure to exchange rate fluctuations arises. Exchange rate exposures are managed by operating a US Dollar based bank account within approved policy parameters and the group does not use derivatives to hedge its exposure.

Credit risk management

Financial assets that could subject the group to credit risk consist principally of bank balances and cash, deposits, trade and other receivables, and short-term investments. The Group bank balances and short-term investments are placed with several financial institutions with at least BBB credit ratings as rated in terms of the Fitch Global Rating system. The Group reviews its trade and other receivables at each balance sheet date to ensure adequate allowances for doubtful receivables or loan write-offs are made, the level of this provision is disclosed in note 6. Credit risk with respect to trade receivables is limited to the large number of customers comprising the Group's customer base and their dispersion across different industries and geographical areas. Accordingly the Group does not have significant concentration of credit risk.

The Group considers its short-term investments to be secured and readily available as cash should the need arise for the conversion of the investments.

The carrying amounts of financial assets included in the balance sheet represent the Group's exposure to credit risk in relation to these assets. The Group does not have any significant exposure to any customer or counter party.

Liquidity risk

Prudent liquidity risk management implies maintaining sufficient cash resources to meet cash flow requirements. Management monitors forecasts of liquidity reserve on the basis of expected cash flow. Analysis of the various requirements is disclosed in note 7 of the financial statements.

Fair values

As at 31 March 2016 the carrying amount of bank balances and cash, deposits, trade and other receivables, trade and other payables, contracts in progress, advances received and short-term borrowings approximated their fair values due to the short-term nature of these assets and liabilities.

The group does not hedge foreign exchange fluctuations.

Interest rate risk

The valuation of interest rate exposure and investment strategies is done on a regular basis. The risk arises from substantial interest-bearing assets at variable interest rates. To minimise exposure to this risk, the Group uses a mixture of variable and fixed interest rates.

29. Irregular expenditure

	MINTEK	GROUP	MINT	ΈK
Figures In Rand	2016	2015	2016	2015
Irregular Expenditure Reconciliation of irregular expenditure				
Opening balance	-	-	-	-
Irregular expenditure current year	294 742	9 772 923	294 742	9 772 923
Condoned or written off by relevant authority	(294 742)	(9 772 923)	(294 742)	(9 772 923)
Irregular expenditure awaiting condonement	-	-	-	-
Details of Irregular Expenditure - Current and prior year				
Tender awarded to a company whose tax clearance certificate				
expired during the awarding process (has been condoned)	-	5 280 561	-	5 280 561
Tender awarded to company that did not meet				
minimum criteria (has been condoned)	294 742	4 492 362	294 742	4 492 362
Total	294 742	9 772 923	294 742	9 772 923



MINDEV (PTY) LTD STATEMENT OF FINANCIAL POSITION AS AT 31 MARCH 2016

		MINDEV (PTY) LTD		
Figures In Rand	Note(s)	2016	2015	
Assets				
Current Assets				
Loans to shareholders	2	39 514 943	39 514 943	
Equity and Liabilities				
Equity				
Share capital	3	100	100	
Retained income		39 514 943	39 514 943	
Total Equity		39 514 943	39 514 943	

MINDEV (PTY) LTD STATEMENT OF CHANGES IN EQUITY AS AT 31 MARCH 2016

		MINDEV (PTY) LTD		
Figures In Rand				
	Share capital	Retained income	Total equity	
Balance at 01 April 2014	100	39 514 943	39 514 943	
Balance at 01 April 2015	100	39 514 943	39 514 943	
Balance at 31 March 2016	100	39 514 943	39 514 943	

MINDEV (PTY) LTD ACCOUNTING POLICIES AS AT 31 MARCH 2016

1. Presentation of Financial Statements

The financial statements have been prepared in accordance with the basis of accounting described in note 1 of the consolidated financial statements, and the Companies Act, 71 of 2008. The financial statements have been prepared on the historical cost basis, and incorporate the principal accounting policies set out below. They are presented in South African Rands.

These accounting policies are consistent with the previous period.

1.1 Basis of consolidation

Loan to shareholder

These financial assets are classified as loans and receivables.

1.2 Taxation

Current tax assets and liabilities

Current tax for current and prior periods is, to the extent unpaid, recognised as a liability. If the amount already paid in respect of current and prior periods exceeds the amount due for those periods, the excess is recognised as an asset.

Current tax liabilities/(assets) for the current and prior periods are measured at the amount expected to be paid to/(recovered from) the tax authorities, using the tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period.

Tax expenses

Current and deferred taxes are recognised as income or an expense and included in profit or loss for the period, except to the extent that the tax arises from:

- a transaction or event which is recognised, in the same or a different period, to other comprehensive income, or
- a business combination.

Current tax and deferred taxes are charged or credited to other comprehensive income if the tax relates to items that are credited or charged, in the same or a different period, to other comprehensive income.

Current tax and deferred taxes are charged or credited directly to equity if the tax relates to items that are credited or charged, in the same or a different period, directly in equity.


MINDEV (PTY) LTD NOTES TO THE FINANCIAL STATEMENT AS AT 31 MARCH 2016

2. Loan to shareholder

	MINDEV	(PTY) LTD
Figures In Rand	2016	2015
Mintek	39 514 943	39 514 943

The loan is interest free and has no repayment terms.

3. Share capital

	MINDEV (PTY) LTD	
Figures In Rand	2016	2015
Aurhorised		
1,000 Ordinary shares of R1 each	1 000	1 000

Issued

Ordinary	100	100
ordinary	100	100

4. Directors' emoluments

No emoluments were paid to the directors or any individuals holding a prescribed office during the year.

5. Related parties

Controlling entity

The company is a wholly owned subsidiary of Mintek. Mindev is engaged in the commercialisation of Mintek patents and technology through the identification of suitable partners. The company, in the ordinary course of business, enters into various sale and purchase transactions with related parties.

None of the directors, officers or the shareholder of the Mintek Group or, to the knowledge of the company, their families, had any interest, direct or indirect, in any transactions which has affected or will materially affect Mindev.

Related party transactions

Related party transactions exist within the Group. During the year no sales transactions were concluded. Details of material transactions with related parties not disclosed elsewhere in the financial statements are as follows:

	MINDEV	(PTY) LTD
Figures In Rand	2016	2015
Relationships		
Holding company	Mintek	
Related party balances		
Loan accounts - Owing by related parties		
Mintek	39 514 943	39 514 943







7. RESEARCH OUTPUTS

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7 RESEARCH OUTPUTS

RESEARCH OUTPUTS

PUBLICATIONS AND CONFERENCE PRESENTATIONS

Peer-reviewed Journals

- Abdellatif M, "Smelting of calcined basic nickel carbonate concentrate in a 200 kW DC arc furnace", The Journal of the Southern African Institute of Mining and Metallurgy, 115 (2015) 691–697.
- Bergmann C, Govender V and Corfield AA, "Using mineralogical characterisation and process modelling to simulate the gravity recovery of ferrochrome fines", Minerals Engineering, (2016). DOI: 10.1016/j.mineng.2016.03.020.
- Couperthwaite RA, Cornish LA, Mwamba IA and Papo MJ, "Effect of processing route on the microstructure and properties of an Fe-Al alloy with additions of precious metal", Materials Today: Proceedings, 2 (2015) 3932–3942.
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- Jones RT. 2015, "Presidential Address: Truth and error in scientific publishing", The Journal of the Southern African Institute of Mining and Metallurgy", 115 (2015) 799–816.
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GLOSSARY

AEMFC	African Exploration Mining and Finance Corporation
ALF	Advanced Leach Facility
AMD	Advanced Materials Division
AMI	Advanced Metals Initiative
ARC	Audit and Risk Committee
ASSM	Artisanal and Small Scale Mining
AVE	Advertising value equivalent
BEE	Black Economic Empowerment
CANSA	Cancer Association of South Africa
CEO	Chief Executive Officer
CoEW	Cobalt electrowinning
CRM	Certified Reference Materials
CSFR	Client Satisfaction Frequency Rate
CSR	Corporate Social Responsibility
DMR	Department of Mineral Resources
DRC	Democratic Republic of Congo
DST	Department of Science and Technology
DTI	Department of Trade and Industry
e-Waste	Electronic Waste
EAP	Employee Assistance Programme
EIFR	Environment Incident Frequency Rate
EWIT	E-waste Implementation Toolkit
GAAP	Generally Accepted Accounting Practice
GDP	Graduate Development Programme
HIFR	Health Incidence Frequency Rate
HMD	Hydrometallurgy Division
HRC	Human Resources Committee
HRD	Human Resources Division
HSS	High Speed Steel
HySA	Hydrogen and Fuel Cells Programme
IA	Internal Audit
IMS	liNgcaphephe Metallurgical Services
IP	Intellectual Property
IT	Information Technology
KPIs	Key Performance Indicators
LTIFR	Lost Time Injury Frequency Rate
MaC	Measurement and Control
MESU	Minerals Economics and Strategy Unit
METF	Minerals Education Trust Fund
MHP	Mixed Hydroxide Product
MoU	Memorandum of Understanding

MQA	Mining qualifications Authority
MTC	Metals Technology Centre
MTEF	Medium Term Expenditure Framework
NIC	Nanotechnology Innovation Centre
NIM	National Institute for Metallurgy
NRF	National Research Foundation
PCB	Printed Circuit Boards
PDFR	Public Dissatisfaction Frequency Rate
PDP	Professional Development Programme
PFMA	Public Finance Management Act
PGMs	Platinum Groups Metals
PLP	Preform Line Products
PMDN	Precious Metals Development Network
R&D	Research and Development
REE	Rare Earth Elements
RMC	Risk Management Committee
RSC	Risk Steering Committee
SADC	Southern African Development Community
SACREF	South African Centralised Refinery
SAF	Submerged-arc furnace
SAQA	South African qualifications Authority
SASSETA	Safety and Security SETA
SEDA	Small Enterprise Development Agency
SETA	Skills Education Training Authority
SHEQ	Safety, Health, Environment and quality
SMMEs	Small, Medium and Micro Enterprises
SPEs	Screen Printed Electrodes
SPPIA	Standards for the Professional Practice of Internal Auditing
SSMB	Small Scale Mining and Beneficiation Division
STEM	Science, Technology, Engineering and Mathematics
тс	Technical Committee
тстс	Total Cost to Company
ToR	Terms of Reference
UCT	University of Cape Town
WIL	Work Integrated Learning
XRT	X-ray transmission



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CONTACT DETAILS

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General Managers

Business Development Research & Development Technology Finance Corporate Services

Divisions

Advanced Materials Analytical Services Biotechnology Engineering & Maintenance Services Finance Human Resources & Training – Bursars & SET promotions Hydrometallurgy Information & Communications Information Technology Measurement & Control Mineral Economics & Strategy Unit Minerals Processing Mineralogy Mintek Conferences Centre Mintek Library Pyrometallurgy Safety, Health, Environment & Quality Small-Scale Mining & Beneficiation Ms. Lentheng Letsholo Ms. Kedibone Mokgalaka Auditor General (AGSA) Ms. Christa Scheepers Ms. Evah Motsego

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