



MINTEK

A global leader in mineral and metallurgical innovation

ANNUAL INTEGRATED REPORT

2022/23





Mintek was established in 1934 by an Act of the South African Parliament as a national mineral research organisation to support the development of the South African minerals industry. The organisation operates under the executive authority of the Minister of Mineral Resources and Energy. With over 89 years of experience and the global footprint of our products and services reaching over 60 countries, Mintek is widely recognised as one of the world's leading technology organisations specialising in mineral processing and extractive metallurgy.

Mintek derives its mandate from the Mineral Technology Act No. 30 of 1989. As articulated in the Act, Mintek was established to meet a national imperative to promote mineral technology and to foster the establishment and expansion of industries in the field of minerals and products through research, development and technology transfer.



Left: Tapping of a DC Arc Furnace tap-hole to remove molten material.

Right: Analysing of samples in the Advanced Materials Division Laboratory.

Mintek General Information

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Auditors: Auditor General South Africa

Bankers: ABSA Bank Limited

List of Abbreviations/Acronyms

Abbreviation	Expanded Form
4IR	Fourth Industrial Revolution
AENE	Adjusted Estimates of National Expenditure
AGSA	Auditor-General South Africa
B-BBEE	Broad-based Black Economic Empowerment
CEO	Chief Executive Officer
CNC	Computer Numerical Control
CSFR	Client Satisfaction Frequency Rate
D&O	Derelict and Ownerless
DC	Direct Current
DMRE	Department of Mineral Resources and Energy
DSI	Department of Science and Innovation
EPMA	Electron Probe Micro-Analyser
ERP	Enterprise Resource Planning
GDP	Gross Domestic Product
GRAP	Generally Recognised Accounting Practice
HIV	Human Immunodeficiency Virus
HR	Human Resources
HVAC	Heating, Ventilation and Air Conditioning
HySA	Hydrogen South Africa
ICT	Information and Communication Technology
IP	Intellectual Property
IPAP	Industrial Policy Action Plan
IPR Act	Intellectual Property Rights from Publicly Financed Research and Development Act
KPI	Key Performance Indicator
LTIFR	Lost Time Incident Frequency Rate
MEA	Membrane Electrode Assembly

MOTT	Mintek Office of Technology Transfer
MPRDA	Mineral and Petroleum Resources Development Act
MQA	Mining Qualifications Authority
MTEF	Medium-term Expenditure Framework
MTSF	Medium-term Strategic Framework
NDP	National Development Plan
NEMA	National Environment Management Act
NIPMO	National Intellectual Property Management Office
PFMA	Public Finance Management Act
PGM	Platinum Group Metals
PPPFA	Preferential Procurement Policy Framework Act
PURCO	Purchasing Consortium
R&D	Research and Development
RDI	Research, Development and Innovation
REE	Rare Earth Element
RMO	Risk Management Officer
RP	Radiation Protection
SACREF	Southern African Centralised Rare Earth Refinery
SET	Science, Engineering and Technology
SEM	Scanning Electron Microscope
SHEQ	Safety, Health, Environment and Quality
SLA	Service-level Agreement
SMART	Specific, Measurable, Achievable, Realistic and Timely
SMME	Small, Medium and Micro Enterprises
TB	Tuberculosis
TRL	Technology Readiness Level
UG2	Upper Group 2 Reef
VAT	Value Added Tax

Contents

1 Board Chairperson's Overview

Board Chairperson's Overview	04
Tshobokanyo ka Modulasetilo wa Boto	06
Umyalezo kaSihlalo Webhodi	08

2 Chief Executive Officer's Review

Chief Executive Officer's Review	12
Tebosešwa ka Motlhankedimogolo	14
Ukubuyekeza kukaMphathi Omkhulu	16
Statement of Responsibility for Confirmation of Accuracy of the Annual Report	18

3 Overview of Mintek

Our Mandate	22
What we do	22
Our Vision	23
Our Mission	23
Our Values	24
Organisational Structure	24
Our Strategic Objectives	25
Mintek Value Chain	25
Mintek Global Footprint	26

4 Research, Development and Innovation

Introduction	30
Advancing Industry Technology in Mineral Processing	30
Supporting Industry in Unlocking Value from Ores	31
Leading the Way: Mintek's Global Leadership in Advancing Concentrator Plants and Furnaces	32
Energy and Minerals Industry: Spearheading Sustainability and Efficiency	33
Water Resource Sustainability: Mintek's Integrated Solutions for Mine Effluents and Impacted Water	33
Minerals Science and Innovation for Health	34
Addressing Challenges of Ownerless and Derelict Mines	34

5 Fostering a Capable Workforce for Industry Excellence

Introduction	38
Advancing SET Expertise	38
Bursaries	38
Internship Programmes	39
Coaching and Mentoring	39
Safety, Health, and Well-being of Our People	39
Mintek Occupational Health and Wellness	39
Notable Achievements and Accolades	40

6 Advancing Society through Science: Our Sustainable Development Initiatives

Introduction	44
Supporting Artisanal and Small-Scale Miners	44
Developing Capacity in the Mineral Sector	44
Science and Environmental Sustainability	45

7 Performance Information

Introduction	48
Strategic Objective 1: Conduct Relevant, Applied Research and Technological Innovation	48
Strategic Objective 2: Foster Industry Establishment and Expansion	49
Strategic Objective 3: Developing a Capable Workforce	50
Strategic Objective 4: Develop and Maintain a World-Class RDI Infrastructure	52
Strategic Objective 5: Ensure Financial Sustainability	53

8 Governance

Introduction	56
Mintek Governance Structure	56
The Mintek Board of Directors	57
Executive Management Committee	65
Statement	69
Governance Framework	69
Board Committees and their Functions	69
Board and Committee Meeting Attendance	70
Remuneration Policy and Practices	71
Board Remuneration	71
B-BBEE Compliance Performance Information	72

9 Risk Management

Introduction	76
Evolving Risk Management Practices at Mintek	76
Mintek Risk Universe	77
Summary of risks after implemented controls and residual risk rating	77

10 Financial Performance

General Information	82
Chief Financial Officer's Report	83
Board's Responsibilities and Approval	84
Audit and Risk Committee Report	85
Report of the Auditor-General	90
Statement of Financial Position	96

Left: Samples are being prepared for heap leaching process.

Right: The pressure leaching facility offers metallurgical test work services for the mining and metallurgical industries.

10 Financial Performance (Continued)

Statement of Financial Performance	97
Statement of Changes in Net Assets	98
Cash Flow Statement	99
Statement of Comparison of Budget and Actual Amounts	100
Accounting Policies to the Annual Financial Statements	102
Notes to the Annual Financial Statements	116
Mindev (Pty) Ltd Annual Financial Statements	165

11 Mintek Research Outputs

Introduction	172
Journal Articles	172
Conference Papers	176
Book Chapters	179

12 PFMA Compliance and Reporting

Procurement by other means	182
Contract variations or expansions	194
Irregular Expenditure	196
Fruitless and Wasteful Expenditure	198



1

Board Chairperson's Overview

Board Chairperson's Overview	04
Tshobokanyo ka Modulasetilo wa Boto	06
Umyalezo kaSihlalo Webhodi	08

The South-West view of Mintek Campus.





Dr Thibedi Ramontja
Chairperson of the Board

1.1 | Board Chairperson's Overview

I am pleased to present the Mintek 2022/23 Annual Report on behalf of the Board of Directors. This report is a testament to the diligent efforts and commitment of Mintek's Board and staff.

The board members have demonstrated exceptional leadership, directing and guiding Mintek with utmost proficiency to ensure the highest standards of corporate governance, diligently following the guidelines set forth by the Public Finance Management Act (PFMA), the Mineral Technology Act, and the Shareholder's Compact. Similarly, the staff of Mintek have played critical roles in ensuring that the organisation continues to produce quality research and services for various stakeholders.

As the Accounting Authority, our responsibility also includes the preparation and fair presentation of the consolidated and separate financial statements in accordance with the South African Statements of Generally Recognised Accounting Practice (GRAP) and the PFMA. Our responsibility entails guiding the entity towards ensuring it meets its financial performance targets, upholds its environmental, social, and governance (ESG) principles, and enhances local economies.

Mintek has remained committed to being a reliable partner to the minerals and metallurgical industries. The past year has been marked by persistently challenging macroeconomic conditions, which have compelled the industry to seek innovative ways to enhance productivity while reducing costs. In the face of these difficulties, Mintek has risen to the occasion, demonstrating resilience and adaptability in pursuit of operational excellence and supporting the revitalisation of the mining sector. This objective has been at the forefront of the Board's focus, and the organisation's performance in the past year reflects the successful efforts made towards this goal.

Our research and development innovations have continued to play a crucial role in generating opportunities for economic growth, job creation, and sustainable development across more than 60 countries worldwide. This international recognition and reputation for technological excellence testify to South Africa's innovation capabilities. By producing world-class technological products, we reinforce the belief in South Africa as an innovative hub and a prominent player in the global technology and research marketplace.

We are pleased with the financial stability achieved by the organisation, a testament to our meticulous financial management and strategic decision-making. Despite challenges such as load shedding, Mintek's financial performance has yielded positive results and a favourable audit opinion by the Auditor-General of South Africa. This achievement establishes a solid foundation for sustainable growth and sets the stage for future prosperity.

Mintek has experienced growth in attaining advanced qualifications in Science, Engineering, and Technology (SET). This accomplishment reflects the dedication and concerted efforts of employees and the organisation in fostering excellence. It underscores Mintek's commitment to developing a highly capable workforce. These exceptional achievements align with our Mintek Strategy 2030, demonstrating our commitment to long-term objectives and positioning us as pioneers of innovation and excellence in the industry.

We are also pleased with Mintek's evolution as a more accessible entity. This is evidenced by the allocation of resources to provide technical expertise, capacity building, and innovative solutions tailored to the unique needs of small-scale miners. Our commitment reflects Mintek's dedication to driving economic

inclusivity in the minerals industry, empowering these miners to thrive and contribute to overall industry growth.

Furthermore, Mintek continues to foster collaborations and partnerships with local and international stakeholders to expand our reach and influence. By embracing open innovation and knowledge sharing, we leverage collective expertise to address complex challenges and develop cutting-edge technologies. This highlights the talent and capabilities of Mintek's team.

Our steadfast implementation of sound financial practices has contributed to this achievement, reaffirming our commitment to financial management excellence. It is also gratifying to see our financial position continue to strengthen, even in the face of significant challenges such as an economic slowdown and load shedding. Mintek's financial indicators have demonstrated commendable performance, providing strong evidence of our organisation's robustness.

Lastly, I wish to express my appreciation to the esteemed Minister of Mineral Resources and Energy, Hon. Samson Gwede Mantashe, MP, for his support, guidance, and collaborative spirit. His contributions and partnership have driven Mintek's progress and reinforced our position as a leading force in the minerals and mining sector.

Chairperson of the Board
Dr Thibedi Ramontja

“Mintek continues to foster collaborations and partnerships with local and international stakeholders to expand our reach and influence.”

Top Left: The pressure leaching facility offers metallurgical test work services for the mining and metallurgical industries.

Top Right: Atomic Force Microscope used in the Advanced Materials Division.

Bottom Right: A South-West view of the Mintek campus.





Dr Thibedi Ramontja
Modula-setulo ya Boto

1.2 | Tshobokanyo ka Modulasetilo wa Boto

Ke itumelela go tihagisa Pegelo ya Ngwaga ya Mintek 2022/23 mo boemong jwa Makaedi ba Boto. Pegelo eno ke bopaki jwa maiteko a bonatla le a maitlamo a Boto le bathapiwa ba Mintek.

Maloko a boto a bontshitse boeteledipele jwa kemogodimo, ba kaela le go gakolola Mintek ka nonofo e e gaisang go netefatsa maemo a a kwa mankankaleng a tsamaiso ya kgwebo, ba latela ka natla dintlhakaedi tse di beilweng ke Molao wa Botsamaisi jwa Ditšhelete tsa Setšhaba (PFMA), Molao wa Thekenoloji ya Minerale, le Tumulano ya Beng Dishere. Fela jalo, le bathapiwa ba Mintek ba tshamekile karolo e kgolo mo go netefatseng gore mokgatlo o tswelela go tihagisa patlisiso e e boleng le ditirelo go baamegi ba ba farologaneng.

Jaaka Bothati jo bo Ikarabelang, maikarabelo a rona a tsenyeletsa gape le thulaganyo le tihagiso e e siameng ya diteitemente tsa ditšhelete tse kopaneng le tse di kgaogantsweng go latelwa Diteitemente tsa Aforika Borwa tsa Tlwaelo e e Amogetsweng ka Kakaretso ya Diakhaonto (GRAP) mmogo le PFMA. Maikarabelo a rona a tsenyeletsa go gakolola setheo mo go netefatseng gore se fitlhelela ditotwa tsa tiragatso ya ditšhelete, tsegetsa melawana ya sona ya tikologo, loago, le bobusi (ESG) le go tokafatsa diikonomi tsa selegae.

Mintek e santse e itlamile go nna molekane yo o botshephegi go diintaseteri tsa diminerale le metšhine ya ditšhipi. Ngwagola e tshwailwe ke maemo ikononikgolo a dikgwetlho tse di tswelletseng ao a gapeleditseng intaseteri go batlana le mekgwa e meswa go tokafatsa tihagiso ntse e fokotsa ditshenyegelo. Mo mathateng a a kana a, Mintek e kgonne go emelana le ona, ya tihagisa boitshoko le itlwaetso mo morerong wa matsetseleko a tiro le go tsegetsa tsosoloso go lephata la meepo. Maitlamo ano a santse a di goga pele mo tsepong ya Boto, mme tiragatso

ya mokgatlo ya ngwagola e supa maiteko a a atlegileng go maitlamo.

Dipatlisiso le ditlhabololo tse diswa di tswelletseng go tsaya karolo ya botlhokwa mo go tihameng ditšhono tsa kgolo ya ikonomi, tlhamo ya ditiro, le tlhabololo e e tswelletseng go ralala dinaga di feta 60 lefatshe ka bophara. Temogo e ya boditšhabatšhaba mmogo le seriti go tsa bomankge go thekenoloji ke bopaki jwa bokgoni jo boswa jwa Aforika Borwa'. Ka go tihagisa dilwana tsa thekenoloji tsa maemo a ntlha, re tsosolosa tumelo go Aforika Borwa jaaka monyobo o moswa le motshamekimogolo go thekenoloji ya lefatshe le lefelothekeiso la patlisiso.

Re itumelela tsepamo ya ditšhelete e e fitlheletsweng ke mokgatlo, bopaki jwa botsaimisi jwa ditšhelete jo bo duleng diatla le botsayatswetso jwa togamaano. Le fa go nnile le dikgwetlho tse di jaaka kgaogo ya motlakase, tiragatso ya ditšhelete ya Mintek e fitheletse dipelo tse di siameng le kakanyo e e rategang ya boruni ke Moruni-kakaretso wa Aforika Borwa. Phitlhelelo eno e tlhama motheo o o tiileng wa kgolo e e tswelelang le go baya serala sa tswelelopele ya isago.

Mintek e itemogetse kgolo ka go fithelela ditshwanelego tse di kwa pejana go Saense, Enjiniere le Thekenoloji (SET). Phitlhelelo e e tihagisa boineelo le maiteko a mokopanelwa a bathapiwa mmogo le mokgatlo go godisa botswerere. E supa boineelo jwa Mintek go aga bodiri jwa bokgoni jo bo kwa godimo. Diphitlhelelo tse di kgethegileng tse di ikamaganya ke Togamaano ya Mintek 2030 ya rona, ka go tihagisa maikaelelo a pakatelele le go re baya jaaka bomasupatsela ba itshimololelo le botswerere mo intasetering.

Gape re lebogela phetogo ya Mintek go nna setheo se se fitlhelegang. Seno se supilwe ke kabo ya didiriswa go neelana ka botswerere go tsa setegeniki, go aga bokgoni le ditharabololo tse diswa tse di tihametsweng ditlhoko tse di kgethegileng tsa borrameepo ka sekala sennye. Maitlamo a rona a tihagisa boineelo jwa Mintek go kgweetsa tsenyeletso go intaseteri ya diminerale, go natlafatsa borrameepo ba go gola le go nna le seabe go kgolo ya intaseteri ya kakaretso.

Go feta fao, Mintek e tswelela go godisa dikgokagano mmogo le bolekanane jwa baamegi ba selegae le ba boditšhabatšhaba go atolosa phitlhelelo le tlhotlheletso ya rona. Ka go amogela itshimololelo e e bulegileng le kabelano ya kitso, re gwetlha boitseanape jwa bokopanelwa go mekamekana le dikgwetlho tsa matswakabele le go aga dithekenoloji tsa maemo godimo. Seno se tihagisa talente le bokgoni jwa setlhophha sa rona.

Tsenyotirisong ya rona e e ikanyegang ya ditlwaelo tse di utlwalang tsa ditšhelete e nnile le seabe go botswerere jwa botsamaisi jwa ditšhelete. Gape, go a namatsha go bona boemo jwa rona jwa ditšhelete bo tswelletseng go matlafala, le mo pakeng ya dikgwetlho tse di masisi tse di jaaka tiego go ikonomi le kgaogo ya motlakase. Ditshupo tsa ditšhelete tsa Mintek di bontshitse tiragatso e e pakiwang, ka go neelana ka bopaki jo bo matla go nonofo ya mokgatlo wa rona.

Kwa bokhutlong, ke rata go lebisa kanaanelo le tlotlo go Tona ya Didiriswa tsa Diminerale le Eneji, Motl. Samson Gwede Mantashe, LP, ka tsegetso, kgakololo, le mowa wa tirisano. Seabe le bolekanemmogo tsa gagwe di kgweeditse kgatelopele ya Mintek le go nonontsha kemo ya rona jaaka ketapele go lephata la diminerale le meepo.



Modulasetilo wa Boto
Ng Thibedi Ramontja

Top Left: The pressure leaching facility offers metallurgical test work services for the mining and metallurgical industries.

Top Right: Atomic Force Microscope used in the Advanced Materials Division.

Bottom Right: A South-West view of the Mintek campus.

“Mintek e tswelela go godisa dikgokagano mmogo le bolekanane jwa baamegi ba selegae le ba boditšhabatšhaba go atolosa phitlhelelo le tlhotlheletso ya rona.”





Dr Thibedi Ramontja
uSihlalo weBhodi

1.3 | Umyalezo kaSihlalo Webhodi

Kuyintokozo ukwethula uMbiko Wonyaka we-Mintek 2022/23 egameni leBhodi Labaqondisi. Lo mbiko uwubufakazi bemizamo nokuzibophezela kweBhodi nabasebenzi. Kuso sonke isikhathi, amalungu ebhodi abonise ubuholi obukhethekile, eqondisa futhi ehola iMintek ngobunyoinco bokuqinisekisa ukuthi amazinga aphakeme kakhulu okuphatha okuhlanganyelwe, elandela ngenkuthalo imihlahlandlela ebekwe uMthetho Wokuphathwa Kwezimali Zomphakathi (Public Finance Management Act [PFMA]), uMthetho Wobuchwepheshe Bezimbiwa, kanye Nokubambisana Kwabanikazi Bezabelo.

Njengesigungu esinesibopho sokubika ngokwenzekayo, isibopho sethu sihlanganisa nokulungiselela kanye nokwethulwa ngendlela efanele kwezitatimende zezimali ezihlanganisiwe nezihlukene ngokuhambisana Nezitatimende ZaseNingizimu Afrika Zendlela Eyaziwayo Yokubalwa Kwezimali (General Recognised Accounting Practice [GRAP]) kanye ne-PFMA. Isibopho sethu sihlanganisa ukuqondisa inkampani ekuqinisekiseni ukuthi ifinyelela imigomo yayo yokusebenza kwezezimali, igcina imigomo yayo yezemvelo, yezehlalo, kanye nokubusa (environment, social governance [ESG]), futhi ithuthukisa umnotho wendawo.

Ngingasho ngokuzethemba egameni leSigungu Esinesibopho sokubika Ngokwenzekayo ukuthi iMintek yenze ngendlela encomekayo endaweni ngayinye kulezi, njengoba uzothola kulo mbiko. Unyaka odlule ugqamiswe yizimo eziyisimbela ezifandabalisa zomnotho eziqhubekayo, eziphoqe imboni ukuthi ifune izindlela ezintsha zokuthuthukisa umkhinqizo ngenkathi yehlisa izindleko. Lapho ibhekene nalobu bunzima, i-Mintek isukume yabonisa ukukhuthazela nokuzivumelanisa nezimo ekuphishekeleni ukusebenza kahle kakhulu.

I-Mintek isalokhu izibophezele ekubeni umlingani onokwethenjela ezimbonini zezimbiwa nezimbiwa phansi. Le nhloso ibihamba phambili ekugxileni kweBhodi kuso sonke isikhathi liphethe, kanti ukusebenza kwenkampani onyakeni odlule kukhombisa imizamo eyimpumelelo eyenziwe ukuze kufinyelwe lo mgomo.

Naphezu kwalezi ziselelo ezinomthelela ekutshalweni kwezimali emkhakheni wezokumbiwa phansi, iMintek ikhombise ukuqina ekwesekeni ukuvuselelwa kwale mboni. Ucwango lwethu nentuthuko yokuqamba kabusha iqhubekile nokubamba iqhaza elibalulekile ekukhiqizeni amathuba okukhula komnotho, ukuvulwa kwamathuba emisebenzi, kanye nentuthuko esimeme emazweni angaphezu kwama-60 emhlabeni jikelele.

Lokhu kuhlonishwa kwamazwe ngamazwe kanye nesithunzi sokwenza kahle kwezobuchwepheshe kufakazela amakhono aseNingizimu Afrika okusungula izinto ezintsha. Ngokukhiqiza imikhinqizo yezobuchwepheshe esezingeni lomhlaba, siqinisa ukukholelwa kwiNingizimu Afrika njengesizinda sokuqanjwa kabusha kanye nombambiqhaza ovelele emhlabeni jikelele wemakethe yobuchwepheshe nocwango.

Sijabule ngokuzinza kwezezimali okuzuzwe yinhlangano, okuwubufakazi bokuphatha kwethu kahle izimali kanye nokuthatha izinqumo ngamasu. Noma kukhona izinkinga ezifana nokuciphisa kukagesi, umsebenzi wezimali we-Mintek uthetha imiphumeleni emihle sathola nombono omuhle wokuhlola ngu-Auditor-General waseNingizimu Afrika. Le mpumelelo isungula isisekelo esiqinile sokukhula okusimeme futhi ibeka inkundla yempumelelo yesikhathi esizayo.

I-Mintek ihlangabezane nokukhula ekuzuzeni iziqu eziphakeme zeSayensi, Ubunjiniyela, kanye Nobuchwepheshe (i-SET).

Lokhu okufeziwe kubonisa ukuzinikela nemizamo ehlangene yabo bobabili abasebenzi kanye nenhlangano ekukhuthazeni ukusebenza kahle. Kugcizelela ukuzibophezela kweMintek ekuthuthukiseni abasebenzi abanekhono eliphezulu. Lezi zinzuzo ezimangalisayo zihambisana nohlelo lethu le-Mintek 2030, elibonisa ukuzibophezela kwethu ezinhlosweni zesikhathi eside nokusibeka njengezingqalabutho zokuqamba izinto ezintsha kanye nokwenza kahle embonini.

Siyajabula futhi ngokuziphendukela kwe-Mintek njengenhlango efinyeleleka kalula. Lokhu kufakazelwa ukwabiwa kwezinsiza zokuhluzeka ngochwepheshe bezobuchwepheshe, ukwakhiwa kwamandla, kanye nezixazululo ezintsha ezihambisana nezidingo ezihlukile zabavukuzi abancane. Ukuzinikela kwethu kukhombisa ukuzinikela kweMintek ekuqhubekiseni ukubandakanywa komnotho embonini yezimbiwa, ukunika laba bavukuzi amandla ukuze baphumelele futhi babe neqhaza ekukhuleni kwezimboni kukonke. Ngaphezu kwalokho, iMintek iyaqhubeka nokugqugquzela ukubambisana nokusebenzisana nababambiqhaza basekhaya nabamazwe ngamazwe ukuze kwandiswe ukufinyelela kwethu kanye nomthelela. Ngokwamukela ukusungula okusha nokwabelana ngolwazi, sisebenzisa ubuchwepheshe obuhlangene ukuze sibhekane nezinsalela eziyinkimbinkimbi futhi sithuthukise ubuchwepheshe obusezingeni eliphezulu. Lokhu kugqamisa ikhono namandla eqembu leMintek.

Okokugcina, ngifisa ukuzwakalisa ukubonga kwami kuNgqongqoshe ohloniphekile Wezimbiwa Namandla, uMnu. Samson Gwede Mantashe, iLungu lePhalamende, ngokwesekwa kwakhe, isiqondiso, nomoya wokubambisana. Amagalelo akhe kanye nokubambisana kube neqhaza elikhulu ekuqhubekiseni phambili inqubekelaphambili ye-Mintek kanye nokuqinisa isikhundla sethu njengamandla ahamba phambili emkhakheni wezokumbiwa phansi nezimayini.



uSihlalo weBhodi
UDkt Thibedi Ramontja

Top Left: The pressure leaching facility offers metallurgical test work services for the mining and metallurgical industries.

Top Right: Atomic Force Microscope used in the Advanced Materials Division.

Bottom Right: A South-West view of the Mintek campus.

“iMintek iyaqhubeka nokugqugquzela ukubambisana nokusebenzisana nababambiqhaza basekhaya nabamazwe ngamazwe ukuze kwandiswe ukufinyelela kwethu kanye nomthelela.”



2

Chief Executive Officer's Review

Chief Executive Officer's Review	12
Tebesešwa ka Motlankedimogolo	14
Ukubuyekeza kukaMphathi Omkhulu	16
Statement of Responsibility for Confirmation of Accuracy of the Annual Report	18

Lancing of a DC Arc Furnace tap-hole to remove molten material.





Dr Molefi Motuku
Chief Executive Officer

2.1 | Chief Executive Officer's Review

The financial year 2022/23 marked the second year of implementing Mintek Strategy 2030, which focuses on enriching our contribution to national priorities and advancing applied research and technologies for mineral-based industries. We are delighted to present this report, showcasing our progress towards these objectives and sharing our achievements over the past financial year. Our dedication to driving technological innovation in mineral resources remains steadfast.

At Mintek, we acknowledge the critical role of our human resource base, especially in technical research, in driving the growth of the minerals industry. We continue to invest in the development and transformation of our workforce, equipping them with the necessary skills to address present and future challenges. By fostering an environment that promotes innovation, our employees are empowered to excel and gain recognition for their outstanding contributions in the fields of science and engineering, both nationally and globally.

We have made significant progress in developing a capable workforce by implementing programmes and initiatives to strengthen our Science, Engineering, and Technology (SET) staff. This has resulted in a notable increase of staff with PhDs by 37% and staff with MSc degrees by 18%. Additionally, our employees are actively pursuing higher qualifications across various academic levels. Our SET cohort comprises a balanced gender representation, with 49% females and 51% males, reflecting our commitment to diversity.

Our researchers have made notable contributions to scientific advancement through the publication of 69 journal papers. Among these, 20 papers are in journals with an impact factor (IF) greater than five, underscoring their significance in their respective fields. Furthermore, our researchers have authored

seven book chapters, showcasing our expertise in minerals technology and our dedication to pushing the boundaries of scientific understanding.

Collaboration with the industry remains a key priority for Mintek. We continue to pilot and demonstrate our technologies, such as the mercury-free iGoli™ process for gold extraction, designed to be environmentally safer and more efficient. Progress has also been made in developing and demonstrating the cloSURE™ process for acid mine drainage treatment, demonstrating our commitment to environmental stewardship.

Mintek's financial position has improved, with an overall revenue increase of 6% (R38.8 million), reaching a total of R649.5 million in the 2022/23 financial year. This improvement stems from increased sales of products and services, asbestos rehabilitation, as well as a rise in state grants and interest income.

Additionally, we remain vigilant in monitoring and addressing potential risks, such as funding uncertainties, to safeguard our financial position and sustain our impactful research and development activities. Mintek remains well-prepared to navigate the evolving economic landscape and deliver sustainable value to our stakeholders through a proactive approach to cost management and risk mitigation.

I extend my gratitude to our dedicated leadership team and employees for their hard work and commitment to Mintek's success. Their contributions are invaluable as we implement Mintek Strategy 2030. I would also like to express appreciation to the Mintek Board for their oversight and support.

The financial year 2022/23 marked the second year of implementing Mintek Strategy 2030, which focuses on enriching

“We have made significant progress in developing a capable workforce by implementing programmes and initiatives to strengthen our Science, Engineering, and Technology (SET) staff. This has resulted in a notable increase of staff with PhDs by 37% and staff with MSc degrees by 18%.”

our contribution to national priorities and advancing applied research and technologies for mineral-based industries. We are delighted to present this report, showcasing our progress towards these objectives and sharing our achievements over the past financial year. Our dedication to driving innovation and technology in mineral resources remains steadfast.

Furthermore, I would like to sincerely thank our valued partners for their unwavering support and dedication, which have been crucial in ensuring mutual growth. Together, we have forged strong collaborations that have propelled us towards our shared objectives. I would also like to express our deep appreciation to the Department of Mineral Resources and Energy for their invaluable guidance, support, and unwavering commitment. Their expertise and partnership have played an instrumental role in shaping our strategies and driving our progress.



Chief Executive Officer
Molefi Motuku

Top left: An open flame fusion process is used for preparation of solid samples.

Middle right: Fuel cell Catalyst developed by Mintek are used as fuel system components.

Bottom right: The Ion Chromatography (IC) used for speciation, cation and anion analysis in the Analytical Chemistry Division.





Dr Molefi Motuku
Motlhankedimogolo

2.2 | Tebosešwa ka Motlhankedimogolo

Ngwaga wa ditšhelete wa 2022/23 o tshwailwe jaaka ngwaga wa bobedi wa tsenyotirisong ya Togamaano ya Mintek 2030, eo e lebeletseng go godisetsa seabe sa rona go ditlapele tsa bosetšhaba le go tsweletsa patlisiso e e dirisiwang le dithekenoloji tsa diintaseteri tse di ikaegileng ka diminerale. Re motlotlo go tihagisa pegelo e, go bontsha kgatelopele ya rona go maikaelelo le go arolelanela diphithlelelo tsa rona mo ngwageng wa ditšhelete o o fetileng. Boineelo go kgweetsa itshimololelo le thekenoloji go didiriswa tsa diminerale di santse di tsepame.

Mo Mintek, re dumela karolo e e bothokwa e e tshamekiwang ke bathapiwa ba rona, mo kgweetsong ya kgolo ya intaseteri ya meepo. Re tswelela go beeletsa go tihabololo le phetogo ya bathapiwa, re ba neela dikgono tse di tlokegang go mekamekana le dikgwetlho tsa gajaana le tsa isago. Ka go tihama tikologo e e tihatlosang itshimololelo, bathapiwa ba rona ba natlafadiwa go dira ka matsetseleko le go lemogelwa diabe tsa bona tse di matshetshe mo dintlheng tsa saense le enjiniere, bosetšhaba le lefatshe ka bophara.

Re fitheletse kgatelopele e kgolo mo go ageng bodiri jo bo kgonang ka go tsenyatirisong mananeo le maitlhommo go matlafatsa bathapiwa ba rona ba Saense, Enjiniere le Thekenoloji (SET). Seno se feleletse go koketsego ya bathapiwa ka 37% ya ba diPHD le 18% ya ba digerata tsa MSc. Ka tlaletso, bathapiwa ba rona ba matlhagathaga go fithelela ditshwanelego tse di kwa godingwana go ralala maemoa akhademike a a farologaneng. Setlhophsa sa rona sa SET sena le kemedi e e lekakanang ya bong, ka 49% ya basadi le 51% banna, eo e tihagisang maitlammo a rona ka go farologana.

Babatlisisi ba rona ba neelane ka diabe tse di bonalagang go tsweletso ya saense ka dikgatiso di le 69 tsa dipampiri mo jenaleng. Magareng ga tsona, dipampiri di le 20 di nale le nthla

ya seabe (IF) e kgothane go feta tse tlhano, tse di fitlhelelang bothokwa jwa tsona go maphata a a maleba a tsona. Go feta fao, babatlisisi ba rona ba kwadile dikgaolo di le supa tsa buka, go tihagisa boitseanape jwa rona go thekenoloji ya diminerale le boineelo jwa rona go tlosa maparego mo go tihaloganyeng saense.

Tirisanommogo le intaseteri e santse e le setlapele go rona. Re tswelela go kgweetsa le go bontsha dithekenoloji tsa rona, tse di jaaka tsamaiso ya mercury-free iGoli™ ya go tlotlha gauta, e e tihamilweng go nna le tshireletso go tikologo le go nonofa go feta. Kgatelopele e dirilwe mo go bontsheng tsamaiso ya CloSURE™ go tseleganyo ya go ntsha esiti ya meepo, go tihagisa boineelo jwa rona go tihokomelo ya tikologo.

Boemo jwa ditšhelete jwa Mintek bo tokafetse, ka koketsego ya 6% go letseno ka kakaretso (R38.8 million), go fithelela madi otlhe a R649 milione mo ngwageng wa ditšhelete wa 2022/23. Tofafalo e e tlhaga go dithekiso tse di oketsegileng tsa ditlhagiswa le ditirelo, tsosoloso ya asebesetose, go tsenyetsa le tihatlosa ya dithuso ka madi ke puso.

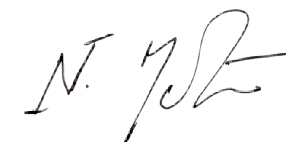
Ka tlaletso, re malala-a-laotswe mo go elengtlhoko le go mekamekana le matshosetsi a a ka tihagelelang a a jaaka go etsaetsaga ga matlole, go tihokomela maemo a rona a tsa ditšheletele go tswelisa patlisiso e e bothokwa le ditirwana tsa tihabololo. Mintek e santse e ipaakantse sentle go fenena lephata le le golang la ikonomi le go neelana ka boleng jo bo tswelang go baamegi ba rona ka mokgwa wa masupatsela go botsamaisi jwa ditshenyegelo le le phokoso ya dikotsi.

Ke isa ditebogo go setlhophsa sa rona se se ikaeletseng sa boeteledipele mmogo le bathapiwa ka go dira ka natla le

“Re fitheletse kgatelopele e kgolo mo go ageng bodiri jo bo kgonang ka go tsenyatirisong mananeo le maitlhommo go matlafatsa bathapiwa ba rona ba Saense, Enjiniere le Thekenoloji (SET). Seno se feleletse go koketsego ya bathapiwa ka 37% ya ba diPHD le 18% ya ba digerata tsa MSc.”

go ikaelela go kgatelopele ya Mintek. Diabe tsa bona di na le boleng jo bogolo jaaka re tsenyatirisong Togamaano ya Mintek 2023. Gape, ke rata go fetsetsa ditebogo go Boto ya Mintek ka okamelole tshegetso ya yona.

Go feta fao, ke rata go leboga balekani ba rona ba ba bothokwa ka tshegetso le boineelo jwa bona, tseo di nnileng bothokwa go netefatsa go gola mmogo. Mmogo, re agile tirisanommogo e e tiileng e e re kgweetsang go maikaelelo a motlhankelwa. Ke leboga gape le Lefapha la Didiriswa tsa Diminerale le Eneji ka dikgakololo, tshegetso, le boineelo jwa lona jo bo tlotlhololo. Boitseanape le boleka jwa bona bo tsere karolo e e bothokwatlhokwa mo go bopeleng ditogamaano tsa rona le go kgweetsa kgatelopele ya rona.



Motlhankedimogolo
Ng Molefi Motuku

Top left: An open flame fusion process is used for preparation of solid samples.

Middle right: Fuel cell Catalyst developed by Mintek are used as fuel system components.

Bottom right: The Ion Chromatography (IC) used for speciation, cation and anion analysis in the Analytical Chemistry Division.





Dr Molefi Motuku
Umphathi omkhulu

2.3 | Ukubuyekeza kukaMphathi Omkhulu

Unyaka wezimali wezi-2022/23 ungunyaka wesibili wokuqaliswa kohlelo iMintek 2030, egxile ekucebiseni igalelo lethu ezintweni ezibalulekile kuzwelonke kanye nokuthuthukisa ucwaningo olusetshenziswayo kanye nobuchwepheshe ezimbonini ezisekelwe kwizimbiwa. Siyajabula ukwethula lo mbiko, ukuze siveze inqubekelaphambili yethu mayelana nalezi zimpokophelo kanye nokwabelana ngempumelelo yethu onyakeni wezimali odlule. Ukuzinikela kwethu ekuqhubekiseni ukusungula izinto ezintsha kanye nobuchwepheshe emithonjeni yezimbiwa kuhlala kugxilile.

Kwa-Mintek, siyalibonga iqhaza elibalulekile lesizinda sethu sabasebenzi, ikakhulukazi ocwaningweni lwezobuchwepheshe, ekuqhubekiseni ukukhula kwemboni yezimbiwa. Siyaqhubeka nokutshala imali ekuthuthukiseni nasekuguquleni abasebenzi bethu, sibahlomise ngamakhono adingekayo ukuze babhekane nezinsalele zamanje nezesehathi esizayo. Ngokukhuthaza indawo ethuthukisa ukusungula izinto ezintsha, abasebenzi bethu banikwa amandla okwenza kahle futhi bathole ukuqashelwa ngeqhaza labo elivelele emkhakheni wesayensi nobunjiniyela, kuzwelonke nasemhlabeni jikelele.

Senze inqubekelaphambili ebonakalayo ekuthuthukiseni abasebenzi abanekhono ngokusebenzisa amasu nezinhlelo zokuqinisa abasebenzi bethu bezeSayensi, Ubunjiniyela, kanye Nobuchwepheshe (Science, Engineering and Technology [i-SET]). Lokhu kuholele ekwenyukeni okuphawulekayo kwabasebenzi abanePhD ngama-37% kanye nabasebenzi abaneziqo ze-MSc ngama-18%. Ukwengeza, abasebenzi bethu baphishekela ngenkuthalo iziqu eziphakeme kuwo wonke amazanga ezemfundo ahlukahlukene. Iqembu lethu le-SET lihlanganisa ukumeleleka kobulili okulinganayo, okungabesifazane abangama-49% nabesilisa abangama-51%, okubonisa ukuzibophezela kwethu ekwahlukeni.

Abacwaningi bethu bakhombise igalelo elibonakalayo ekuthuthukiseni kwesayensi ngokushicilelwa kwamaphepha ejenali angama-69. Phakathi kwalokhu, amaphepha angama-20 ashicilelwe kunajenali anomthelela (impact factor [IF]) omkhulu kunesihlanu, ogcizelela ukubaluleka kwawo emikhakheni yawo. Ngaphezu kwalokho, abacwaningi bethu babhale izahluko zezincwadi eziyisikhombisa, ezibonisa ulwazi lwethu lobuchwepheshe bezimayini Kanye nokuzinikela kwethu ekuqhubekiseni imingcele yokuqondwa kwesayensi.

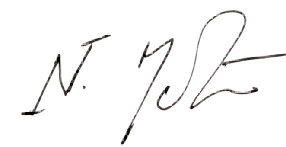
Ukusebenzisana nembali kusalokhu kuyinto esemqoka kakhulu kwi-Mintek. Siyaqhubeka nokuhlola nokubonisa ubuchwepheshe bethu, njengenqubo ye-iGoli™ engena-mercury yokukhipha igolide, eklanyelwe ukuphepha kwemvelo nokusebenza kahle kakhudlwana. Kwenziwe inqubekelaphambili ekuthuthukiseni nasekuboniseni inqubo ye-CloSURE™ yokwelashwa kwe-acid emayini, okubonisa ukuzibophezela kwethu ekunakekeleni imvelo.

Isimo sezimali se-Mintek sibe ngcono, njengoba isiyonke imali engenayo inyuke ngesi-9% (izigidi ezingama-R54), yafinyelela ezigidini ezingama-R654 ngonyaka wezimali ka-2022/23. Lokhu kunyuka kubangelwa ukwanda kokuthengiswa kwemikhqizo nezinsiza, kanye nokukhuphuka kwezibonelelo zikahulumeni. Naphezu kwezinsalele ezifana nokucinywa kukagesi, ukusebenza kwezimali kwe-Mintek kube nemiphumela emihle, futhi silindele ukuthola umbono wocwaningomabhuku ongenacaphaza kuMchwani Mabhuku-Jikelele waseNingizimu Afrika.

Ngedlulisa ukubonga kwami eqenjini lethu labaholi abazinikele kanye nabasebenzi ngokuzikhandla kwabo nokuzinikela empumelelweni ye-Mintek. Igalelo labo libalulekile njengoba sisebenzisa uhlelo lwe-Mintek 2030.

“Senze inqubekelaphambili ebonakalayo ekuthuthukiseni abasebenzi abanekhono ngokusebenzisa amasu nezinhlelo zokuqinisa abasebenzi bethu bezeSayensi, Ubunjiniyela, kanye Nobuchwepheshe (Science, Engineering and Technology [i-SET]). Lokhu kuholele ekwenyukeni okuphawulekayo kwabasebenzi abanePhD ngama-37% kanye nabasebenzi abaneziqo ze-MSc ngama-18%.”

Ngithanda futhi ukubonga iBhodi le-Mintek ngokusingamela kanye nokuseseka. Ngaphezu kwalokho, ngithanda ukubonga ngobuqotho ozakwethu esibazisayo ngokuseseka kwabo okungantengantengi nokuzinikela, obekubalulekile ekuqinisekiseni ukukhula ngokubambisana. Sisonke, sakhe ukusebenzisana okuqinile okusiqhubezele ezinhlosweni zethu esabelana ngazo. Ngithanda futhi ukuzwakalisa ukubonga kwethu okujulile kuMnyango Wezezimbiwa Namandla ngesiqondiso sawo esibalulekile, ukwesekwa kanye nokuzinikela okungantengantengi. Ubungcweti babo nokusebenzisana kwabo kubambe iqhaza elikhulu ekulolongeni amasu ethu nasekuqhubekiseni phambili inqubekelaphambili yethu.



Umphathi omkhulu
UDkt Molefi Motuku

Top left: An open flame fusion process is used for preparation of solid samples.

Middle right: Fuel cell Catalyst developed by Mintek are used as fuel system components.

Bottom right: The Ion Chromatography (IC) used for speciation, cation and anion analysis in the Analytical Chemistry Division.





Left: Trommel screen used for determining the particle size distribution of run-off mine material before comminution.



Middle: Button Arc Furnace is used for melting of metal powders into solid metal buttons.

Bottom right: Geochemical analysis of powder samples using benchtop ED-XRF.

2.4 | STATEMENT OF RESPONSIBILITY FOR CONFIRMATION OF ACCURACY OF THE ANNUAL REPORT

We confirm the following to the best of our knowledge and belief:

All information and amounts disclosed in the annual report are consistent with the annual financial statements audited by the Auditor-General.

The annual report is comprehensive, accurate, and does not contain any omissions.

The annual report has been prepared following the guidelines for annual reports issued by the National Treasury.

The annual financial statements have been compiled in accordance with the Financial Reporting Standards applicable to Mintek.

The annual report accurately represents Mintek's operations, performance information, human resources data, and financial affairs for the fiscal year ended 31 March 2023.

Chief Executive Officer
Dr Molefi Motuku
28 July 2023

Chairperson of the Board
Dr Thibedi Ramontja
28 July 2023

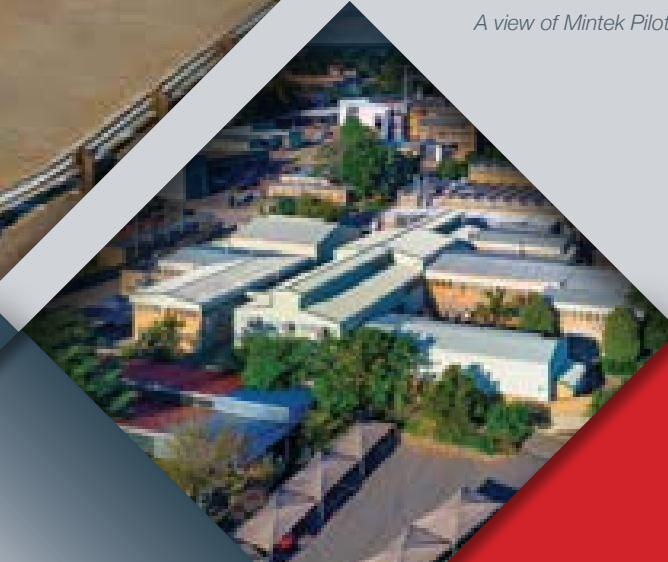


3

Overview of Mintek

Our Mandate	22
What We Do	22
Our Vision	23
Our Mission	23
Our Values	24
Organisational Structure	24
Our Strategic Objectives	25
Mintek Value Chain	25
Mintek Global Footprint	26

A view of Mintek Piloting facilities.





Left: A new smelting facility under construction at Mintek.

Middle: An open flame fusion process is used for preparation of solid samples for OCP-OES and UV analysis.

Top Right: A bottom view of a spiral concentrator used in mineral processing.

Bottom Right: A South-West view of the Mintek Campus.



3.1 | Our Mandate

Through research, development and technology transfer, Mintek's mandate is to promote mineral technology and foster the establishment and expansion of industries in the field of minerals and products derived therefrom. The fulfilment of this mandate is crucial in addressing some of the significant challenges currently faced by South Africa, including the deceleration of economic growth and the urgent need to combat the triple challenges of poverty, unemployment, and inequality. By fostering industrial growth and development, Mintek actively contributes to overcoming these challenges and promoting a more prosperous future.

3.2 | What We Do

At Mintek, we possess a comprehensive range of capabilities and operations encompassing research, development, and innovation throughout the minerals value chain. Our services encompass supporting exploration services through sample analysis and ore characterisation, mineral processing, extraction, refining, and production of metal-based products, process development, and post-mining support. Our product line extends from end-user consumer products to physical and virtual solution-based products and services.

Our ultimate aim is to transform minerals to impact lives positively. We fully recognise the significant influence minerals have on economies, and through our innovative approaches, we aim to unlock their value and catalyse opportunities within our mineral-based economy. We employ a focused approach that emphasises scientific excellence and technological

breakthroughs that positively impact the industry. We take great pride in leading the way in mineral technology innovation, not only within Africa but also globally.

Mintek's core business is centred on the following three pillars:

R&D and Technology Innovation: Mintek conducts research and development to create efficient mineral processing technologies and develop value-added products and services. This pillar focuses on improving technical processes and methods to enhance mineral production. Mintek also offers comprehensive metallurgical feasibility studies and a range of services to companies evaluating opportunities to explore the development of new mineral initiatives. These services include initial investigations, process development and design, construction, and the commissioning of industrial plants.

Industry Support: This pillar focuses on fostering the establishment and expansion of industries in the field of minerals and products derived thereof whilst transferring Mintek-developed technologies to industry. We maintain close contact with the industry to ensure a clear understanding of industry needs so we can incorporate them into our research and development pipeline. Mintek works closely with the sector by forming strategic collaborations with industry players, academic institutions, research institutions, government bodies, state-owned entities, and communities.

Human Capital Development: Mintek is dedicated to investing in the development of its human capital and organisational skills to establish world-class excellence in research and development. Recognising its workforce's value, Mintek strongly emphasises nurturing and enhancing its employees' skills, knowledge, and expertise, ensuring they remain at the forefront of their respective fields.

3.3 | Our Vision

“Our vision is to be a global leader in mineral and metallurgical innovation”.

3.4 | Our Mission

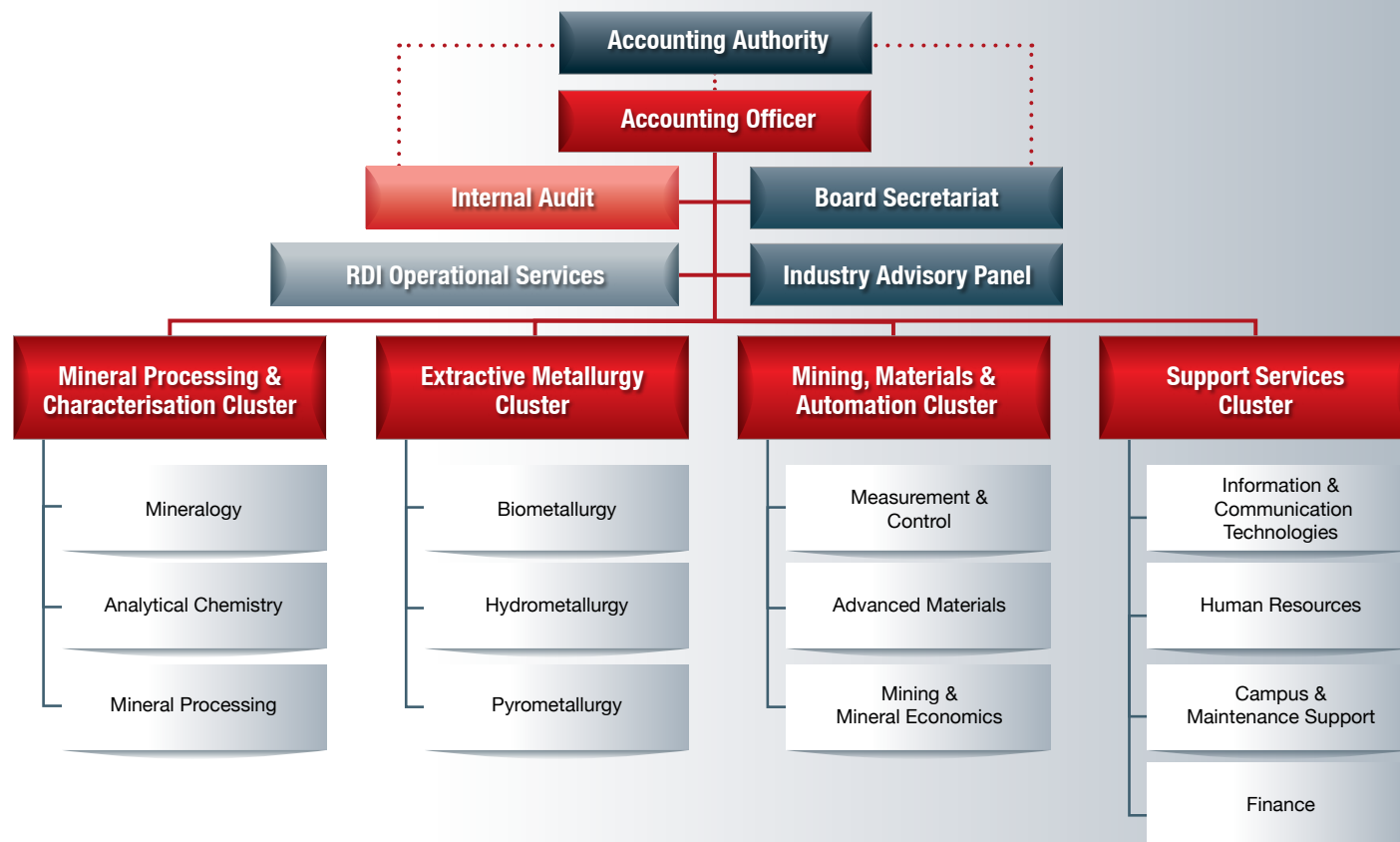
“Our mission is to lead innovation and technology excellence in mineral resources to drive development and inclusive economic growth”.



3.5 | Our Values



3.6 | Organisational Structure



3.7 | Our Strategic Objectives

To fulfil its mandate and achieve its strategic goals, Mintek focuses its operations on the following key strategic objectives:

- The first objective is to conduct relevant applied research that is both useful and impactful, yielding high-impact scientific outputs and outcomes that contribute to advancements in the field.
- The second objective is to foster industry growth and development. This objective highlights Mintek's commitment to the growth and development of industries within the minerals sector, supporting the establishment and expansion of existing industries in this crucial field.
- The third objective is the development of a capable and diverse workforce. Recognising people as its most valuable asset, Mintek strives to attract and develop a workforce

aligned with its strategy and representing our broad cultures and communities.

- The fourth objective is to achieve financial sustainability. Attaining this objective will enable the organisation to continue its impactful research and development activities, ensuring their long-term viability and impact.
- The fifth and final objective focuses on infrastructure development, specifically the creation of a Mintek campus of the future equipped with state-of-the-art facilities and resources to support its scientific research goals and drive innovation in the industry.

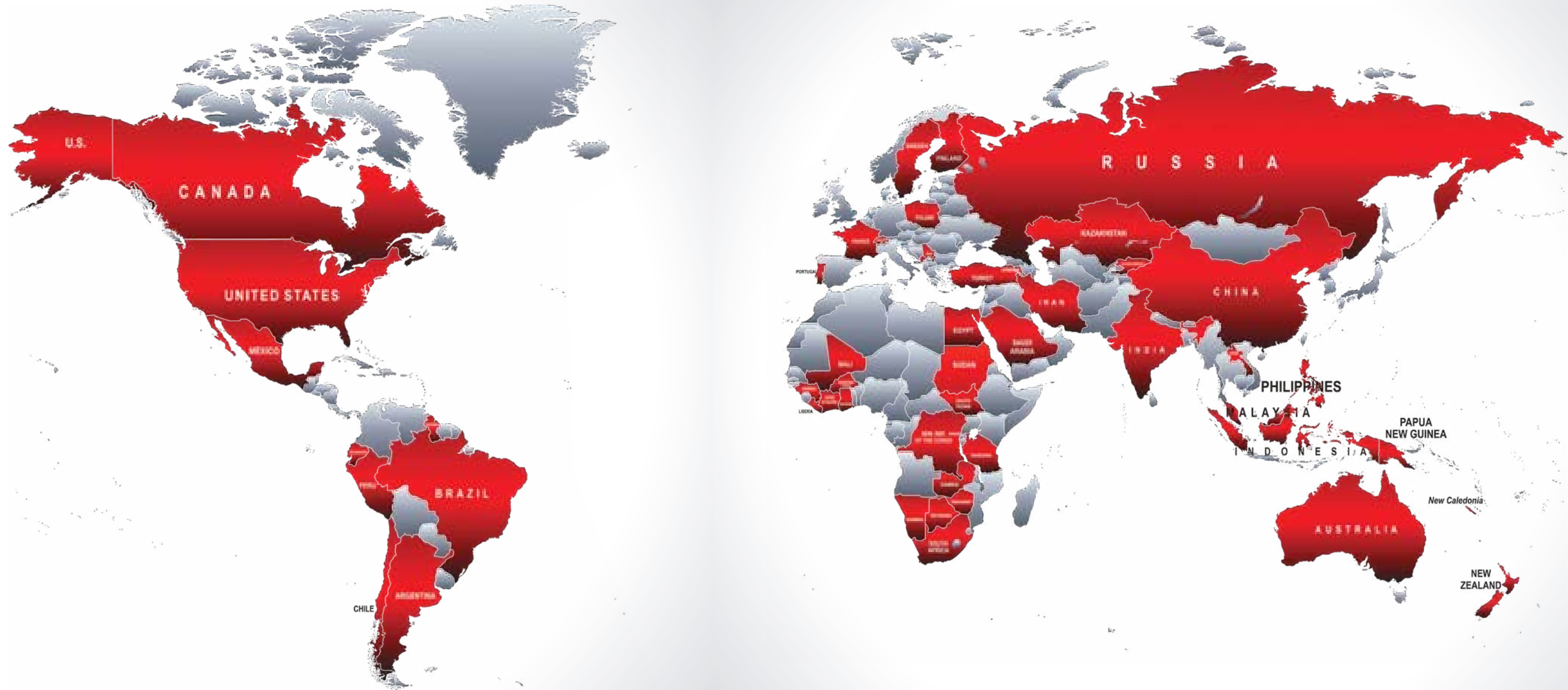
By meticulously integrating these objectives into a coherent strategy, Mintek strives to strike a delicate balance between competing priorities, ensuring its continued success and positive impact in the field of research and development.

3.8 | Mintek Value Chain



3.9 | Mintek Global Footprint

Mintek operates on a global scale, although it is geographically located in Randburg. During the reporting period, our products and services reached 60 countries across the globe, including South Africa.



MEASUREMENT & CONTROL

Instruments Only

Argentina, Armenia, Burkina Faso, Ghana, Guyana, Indonesia, Kyrgyzstan, Laos, Mauritania, Namibia, Peru, Philippines, Russia, Saudi Arabia, Guinea, Tanzania, Sudan, Serbia, Montenegro, South Sudan, Ecuador, Liberia.

Instruments and Process Control

Chile, Brazil, United States, France, Kazakhstan, Finland, Australia, Papua New Guinea, South Africa, Zimbabwe, Zambia, DR Congo, Cote d' Ivoire, Mali, New Zealand, Mexico, Turkey, Canada.

PROCESS CONTROL

Botswana
India
Iran
China
Sweden
Portugal
Egypt
Poland
Malaysia

TANK BIOLEACHING TECHNOLOGIES

Australia
China
Mexico

HEAP BIOLEACHING TECHNOLOGY PILOTING

South Africa
Chile
Zambia
DRC
Namibia

PYROMETALLURGY – FERROCHROME, COBALT, NICKEL AND BATTERY RECYCLING

South Africa
Kazakhstan
Zambia
New Caledonia
Switzerland



4

Research, Development & Innovation

Introduction	30
Advancing Industry Technology in Mineral Processing	30
Supporting Industry in Unlocking Value from Ores	31
Leading the Way: Mintek's Global Leadership in Advancing Concentrator Plants and Furnaces	32
Energy and Minerals Industry: Spearheading Sustainability and Efficiency	33
Water Resource Sustainability: Mintek's Integrated Solutions for Mine Effluents and Impacted Water	33
Minerals Science and Innovation for Health	34
Addressing Challenges of Ownerless and Derelict Mines	34

Pulsed Columns used for the solvent extraction process in the Hydrometallurgy Division.



Left: Bacterial cultures are maintained in the laboratory for the heap and tank leaching of ores.

4.1 Introduction

At Mintek, our comprehensive capabilities cover the entire mineral value chain, encompassing mining, concentrating (mineral processing), extraction, refining, production of metal-based products, process development, and post-mining support. This past year, we continued to focus our work on conducting research that has impactful outcomes for the industry globally and drives technological innovations that have a positive societal impact, drive economic growth, and reduce unemployment, inequality, and poverty in South Africa.

The metallurgy industry faces various challenges, including lower-grade ores, complex mineralogy, escalating process costs, and energy and water availability constraints. Mintek continues to lead the way in driving technological innovations that enhance

metal recovery using both conventional and emerging processes. Through innovative approaches, we strive to enhance efficiency, promote sustainability, and strengthen the economic viability of metal extraction and processing. Our goal is to transfer these technologies to the industry, supporting the industrialisation and growth of the mining and metals sectors in South Africa.

Furthermore, we are firmly committed to addressing pressing national priorities such as the challenge of ownerless and derelict mines and combating illegal mining and trading in ores. Our endeavours align with the government's policy of supporting small-scale miners, addressing environmental sustainability, and fostering sustainable growth within the industry.

4.2 Advancing Industry Technology in Mineral Processing

The financial year 2022/23 has been a remarkable period for Mintek as we continued to drive advancements in flowsheet design, milling efficiency, flotation technology, and process control. Our commitment to innovation continues to drive efficiency, cost reduction, and improved metallurgical performance for our clients.

Advanced Imaging and Scanning

In the preceding year, Mintek leveraged cutting-edge imaging and scanning technologies to unlock in-depth insights into the composition of precious and base metals. By employing techniques such as 3D computed tomography and automated microscopy, we successfully garnered invaluable information regarding the distinctive characteristics of these materials.

This advanced approach enabled us to push the boundaries of knowledge and deliver unprecedented clarity in our analysis.

Mintek's AutoMill Redefines Efficiency

Mintek's AutoMill, a fully instrumented pilot-scale ball mill, has proven to be a game-changer in enhancing milling efficiency. Throughout the year, we optimised mill designs, reducing costs and improving our clients' operational efficiency. The AutoMill's application during pre-commissioning studies has been invaluable, enabling researchers to achieve optimal results while significantly reducing the amount of ore needed compared to traditional methods.

Maximising Recovery with Mintek's Cutting-Edge Midi-Plant

Our Flotation Midi-Plant Piloting Facility has transformed the design and optimisation of flotation operations. Both locally and internationally, major mining companies continue to benefit from this facility, enhancing their flotation operations and maximising the recovery of valuable minerals. By harnessing these state-of-the-art technologies, we have consistently achieved optimal flotation performance using less than ten times the sample material, a significant improvement over other conventional methods. Additionally, the adoption of advanced technologies such as Hydrofloat™ has improved energy efficiency and overall metallurgical performance.

Mintek's Cutting-Edge Process Control Solutions

Mintek's expertise in flowsheet design and optimisation is complemented by our focus on mechanistic modelling and process control. Through extensive collaboration and validation efforts, we have successfully developed models for complex processes like comminution, physical separation, and chemical separation. Our nuclear imaging measurements at iThemba LABS have provided crucial data for developing online control tools. Mintek's model, which offers accurate predictions per size class, surpasses competing models in both accuracy and usefulness.

We will continue to embrace innovation, collaboration, and excellence as we shape the future of industry technology, unlocking new possibilities and driving sustainable growth.

Right: A glimpse into the inner workings of a ball mill used in mineral processing mix and blend different mineral ores.

4.3 Supporting Industry in Unlocking Value from Ores

Unlocking Value: Mintek's Innovations in Heap Leaching

Over the past year, Mintek continued to support the industry with its world-class heap leaching facilities. Heap leaching, an extractive metallurgical technique, allows for the cost-effective processing of various types of low-grade ores and waste rock that would otherwise not be economically viable. Mintek's capabilities have enabled the successful execution of large-scale column-leach projects for clients.

Mintek conducted metallurgical test work for a ground-breaking project in Africa, utilising chloride leaching to recover copper from ore. This project has the potential to be a significant milestone for the continent. Additionally, Mintek is actively involved in a long-term process development programme for an international mining company, focusing on heap leaching of copper from low-grade ore. It is expected that these efforts will yield positive results for the industry.

Mintek continues to advance research in the heap leaching of low-grade ores. One area of exploration involves the development of an alkaline heap leach process for treating low-grade, sulphide-bearing gold ores. Another focus area is the development of a heap leach process that incorporates an acid-proof binder to address the treatment of ores containing high clay and/or silt content. If successful, this new method could create many exciting possibilities for extracting valuable materials from these types of ores.



Left: The 200kva DC Arc Furnace used for the smelting of commodities.



Physical Separation and Physicochemical Solutions

Mintek continued to advance industry solutions that enhance resource efficiency by offering physical separation and physicochemical solutions to upgrade iron ore, base metals, industrial minerals, battery minerals, and PGMs. These include gravity separation, magnetic separation, electrostatic separation, dense medium separation and flotation. These processes, conducted in labs and on pilot scales, are crucial for making the extraction of iron ore and other valuable commodities more efficient. By using these techniques, Mintek helps clients reduce costs.

In the past year, Mintek has made significant advancements in extracting valuable resources that were previously considered unprofitable. These breakthroughs have effectively extended the lifespan of mines by up to two decades and have been achieved through collaborations with primary iron ore producers.

Fostering Global Collaboration in Pyrometallurgy

Mintek's ability to scale up processes and operate pilot-scale operations is a key driver for collaboration, positioning us as a sought-after partner in the area of pyrometallurgy. Mintek is currently engaged in three European Union-funded projects: Prema, SisAI, and HAIMan. These projects leverage Mintek's pyrometallurgical piloting facilities to demonstrate energy-efficient process flowsheets in the production of manganese ferroalloys and carbon-free silicon metal production. By participating in these projects, Mintek contributes to the development and adoption of energy-efficient technologies and processes in the South African ferroalloys industry, enabling the localisation of globally competitive practices.

Mintek hosted the inaugural South African Institute of Mining and Metallurgy (SAIMM) International Conference on the Enhanced Use of Thermodynamic Data in Pyrometallurgy Teaching and Research in September 2022. We were able to achieve this through our involvement in the Programme for International Partnerships (INPART), which the Norwegian Research Council funded under the flagship project called "Thermodynamic from Nanoscale to Operational Scale" (THANOS). The conference brought together renowned experts, scholars, and industry professionals from South Africa and worldwide to explore the latest advancements, challenges, and opportunities in pyrometallurgy.

These initiatives position South Africa as a critical player in the adoption of globally competitive practices and drive sustainable growth in the field of pyrometallurgy.

Advancing Sustainable Mining: The iGoli™ Process for Responsible Gold Extraction

The iGoli™ process is an innovative mercury-free gold extraction method developed by Mintek, specifically designed to provide artisanal miners with a safer and more efficient alternative to the traditional process involving mercury.

Mintek is currently piloting the process in collaboration with Above Average Mine. This project seeks to introduce the iGoli™ process to artisanal gold miners in Barberton. Mintek plans to conduct further pilot runs in the upcoming financial year to further optimise the process. By adopting the iGoli™ process, Mintek aims to contribute to environmentally sustainable mining practices while promoting the well-being of artisanal miners.

4.4 Leading the Way: Mintek's Global Leadership in Advancing Concentrator Plants and Furnaces

Global Strides for Mintek's MillStar and FloatStar Systems

Mintek has achieved remarkable success in international instrument sales, overcoming obstacles in the supply chain. Our Cynoprobes have gained traction throughout the year among customers in the Democratic Republic of Congo, Canada, Ghana, Turkey, Australia, Tanzania, and Mexico, expanding our global footprint. Additionally, our Lab Cynoprobes have attracted customers in Tanzania, Australia, India, Canada, and Russia. Furthermore, the Carbon Concentration Meter (C2M) has experienced successful sales in Australia and Turkey, highlighting our strong presence in those markets.

As a testament to the quality of our systems, Vedanta HZL, a prominent company in India, has established a long-term partnership with Mintek by standardising the highly efficient Mintek MillStar and FloatStar products for control purposes

in its lead and zinc concentrator plants. This collaboration not only showcases their commitment to excellence but also guarantees continuous support and optimisation of operations by Mintek. As a result of this achievement, Mintek received its first benefit-sharing payment for the systems. Vedanta HZL has also expressed a desire to extend the system to another of their remaining plants.

4.5 Energy and Minerals Industry: Spearheading Sustainability and Efficiency

Advancing Energy Storage Solutions

Energy storage is critical to the global shift towards sustainable energy usage. With its abundant reserves of nickel, vanadium, manganese, rare earth elements, and alkali metals, South Africa holds a strategic position in the global supply of precursor battery materials and the development of energy storage technologies. Mintek's expertise in producing high-purity battery precursors, including nickel sulphate, cobalt sulphate, and manganese sulphate monohydrate places the institution at the forefront of the development of battery precursor technology. Collaborating with commercial partners, Mintek is striving to optimise technology and enhance capacity for the extraction and purification of battery materials and rare earth elements (REE) from various sources.

Our ongoing research focuses on extracting REE from diverse waste streams and exploring alternative separation processes.

Establishment of the Hydrogen South Africa (HySA) National Programme

In 2007, the South African Government, in collaboration with the Department of Science and Innovation (DSI), embarked on a transformative journey by establishing the Hydrogen South Africa (HySA) National Programme. This visionary initiative aims to foster a hydrogen economy in South Africa while creating local opportunities for platinum beneficiation. Mintek, as the co-host of the HySA Catalysis Centre of Competence (HySA/CoC), has played a pivotal role in this programme by accumulating substantial expertise and intellectual property in platinum-based fuel cell catalyst production and membrane electrode assemblies (MEAs) development for hydrogen fuel cells and electrolyzers.

Top: Mintek has developed R&D expertise in fabricating LME (London Metal Exchange) grade battery materials at laboratory and pilot scales.

Middle: The Mintek effluent plant treats water effluent before reuse.

Bottom: A micro XRF image of a Pyroxemite rock associated UG2 ores.

Mintek has successfully commissioned a fuel cell demonstration plant, integrating components from HySA partners and our advancements. This cutting-edge demonstration system, located at Mintek, generates 5kW of electricity, which is planned to power critical sections of the Department of Home Affairs office, Mintek itself, and the traffic lights at the entrance of the Mintek campus. This demonstration not only showcases the potential of fuel cell technology but also highlights the practical application and benefits it can offer in real-world settings. By pioneering fuel cell deployment, Mintek is actively contributing to the advancement of sustainable energy solutions.

4.6 Water Resource Sustainability: Mintek's Integrated Solutions for Mine Effluents and Impacted Water

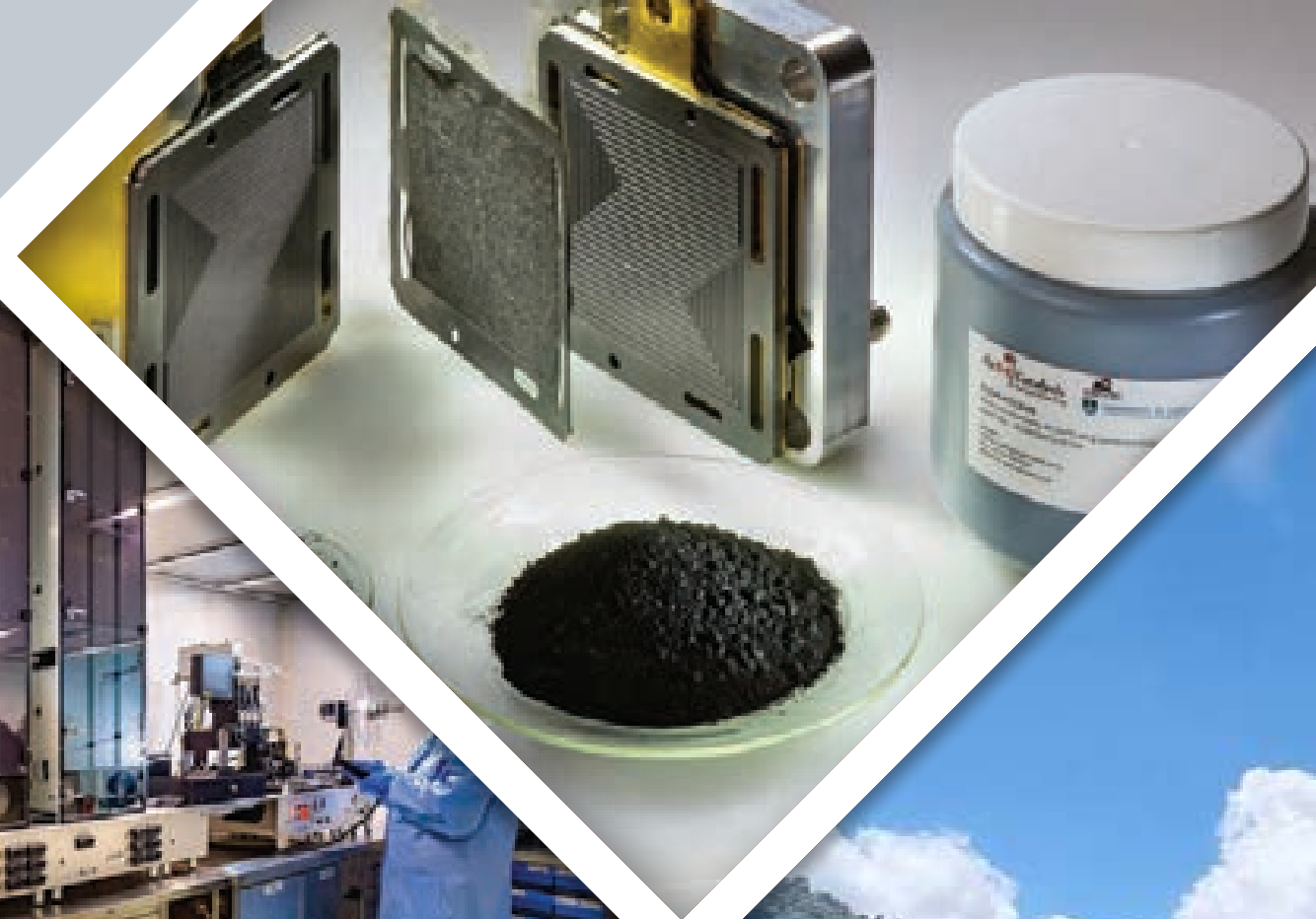
The uncontrolled discharge of mine-impacted water from mine and ownerless sites presents significant risks to the mining industry, the environment, and water users. Mintek's integrated solutions for mine effluents and impacted water demonstrate our commitment to water resource sustainability. Through the cloSURE™ process and the advancement of the NICMeR™ low-fouling ultrafiltration membrane, Mintek plays a pivotal role in mitigating the environmental impact of mine-impacted water and promoting the responsible management of water resources.





Top Left: The Phila-Test HIV 1/2 lateral flow test device, developed by Mintek, is used in the healthcare sector for HIV detection.

Middle Right: The Mintek cleanroom facility is used for the research and development of nanotechnology-based lateral flow devices.



Top Right: Fuel cell catalysts developed by Mintek are used as fuel cell system components.

Bottom Right: The Uitval Asbestos Mine site in Limpopo province rehabilitated reduce exposure risk humans and animals.



4.7 Minerals Science and Innovation for Health

In the reporting year, Mintek reached a significant milestone by conducting the first clinical trials on a locally produced HIV rapid diagnostic test (RDT) kit in South Africa, marking the final step in the pre-qualification process. The rapid diagnostic test kit is based on gold nanotechnology pioneered by Mintek under the Department of Science and Innovation (DSI)/Mintek Nanotechnology Innovation Centre (NIC) National Programme.

In collaboration with Ubuntu Clinical Research, Mintek evaluated the performance of the test kits against the rigorous World Health Organisation (WHO) specifications in high HIV prevalence areas within Gauteng. Following the South African Health Products Regulatory Authority (SAHPRA) and Pharma Ethics approved protocols, 1550 patients underwent testing for HIV1 and 2. The clinical trials yielded promising outcomes, demonstrating that the Phila-Test HIV1/2 Test Kit, developed by Mintek, met the stringent requirements outlined in TSS-1 of the WHO.

4.8 Addressing Challenges of Ownerless and Derelict Mines

Derelict and ownerless (D&O) mines present significant risks, not only to the environment but also to local communities. Mintek recognises the importance of responsible mine closure for environmental conservation and social and economic stability. These abandoned mining sites often become breeding grounds for criminal activities, such as illegal mining, theft, and trespassing. These activities compromise the safety and security of nearby communities and have detrimental effects on the environment and natural resources.

Mintek continued to implement the Derelict and Ownerless Mines Rehabilitation Programme, which is being conducted in collaboration with and funded by the Department of Mineral Resources and Energy (DMRE). In FY2023, 95 holings were closed in the West Rand and Ekurhuleni and two (2) asbestos rehabilitation sites were completed in Limpopo and Northern Cape provinces. By sealing dangerous mine shafts and holings, Mintek prevents unauthorised access and illegal activities and ensures the safety and well-being of surrounding areas.

Furthermore, our efforts in mine closure and rehabilitation help to address the environmental degradation caused by these abandoned mining sites. By restoring and reclaiming the land, we mitigate the release of harmful substances into the environment, protect water resources, and promote ecosystem recovery.



5

Fostering a Capable Workforce for Industry Excellence

Introduction	38
Advancing SET Expertise	38
Bursaries	38
Internship Programmes	39
Coaching and Mentoring	39
Safety, Health, and Well-being of Our People	39
Mintek Occupational Health and Wellness	39
Notable Achievements and Accolades	40

Left: Upscaling of polymer powder modification in a jacketed glass reactor.

Below: A DC Arc Furnace at Mintek.





Top left: The QEMSCAN is used in mineralogy division to measure mineralogical variability of materials based on chemistry. **Middle:** Molten material pours from a DC Arc Furnace during a smelting pilot campaign at Mintek.

Top right: A Test Rig for Hydrogen-Induced Cracking (HIC) & Sulphide Stress Corrosion Cracking (SSCC) sensitivity testing of different materials.

5.1 Introduction

In line with our objective of attracting, developing, and retaining a competitive workforce, Mintek is dedicated to creating and maintaining a work environment that enables our employees to thrive and contribute to our collective success. We recognise that a skilled and motivated workforce is instrumental in driving innovation and achieving our strategic objectives, as articulated in Mintek Strategy 2030. With a focus on science, engineering, and technology (SET) roles, we strive to attract top talent, provide comprehensive development opportunities, and create an inclusive culture that encourages excellence.

Mintek has strengthened and expanded its SET staff complement to deliver on our strategic objectives and KPIs effectively. We achieved this by conducting targeted recruitment drives to reinforce critical technical functions, leveraging postdoctoral research candidates and postgraduate interns to develop new areas of expertise and facilitate project execution, and providing research funding and bursaries to staff, enabling them to upgrade their qualifications to a postgraduate level.

5.2 Advancing SET Expertise

At the end of the reporting year, our total headcount was 527 staff members, comprising 460 permanent employees and 67 fixed-term contractors. Notably, 239 of our team members were engaged in SET roles.

The completion of the People Optimisation Project, responsible for implementing organograms aligned with the approved Mintek Business Model, ensures that we have a streamlined and efficient distribution of our workforce across all divisions.

Simultaneously, we initiated a comprehensive review of Mintek's Human Capital policies to align them with our vision and strategy, fostering an enabling environment and carefully cultivating a culture of excellence that drives continuous improvement.

To elevate Mintek's reputation as a leading partner in innovative mineral solutions, we prioritised increasing the number of Mintek SET staff with Master's and Doctoral qualifications aligned with our core technical disciplines and research focus areas. By enhancing Mintek's doctoral qualification profile, we ensure that we match those of local and international peer research and technology organisations and that our outputs generate maximum technical impact.

5.3 Bursaries

During the 2022/2023 period, Mintek awarded 47 bursaries (38% male, 62% female) in the SET pipeline to undertake postgraduate degrees in various fields of science and engineering. This includes 14 Doctorates, 30 Master's degrees, and 3 Postgraduate diplomas. These postgraduate studies are being pursued at nine local universities and focus on disciplines such as metallurgy and materials science, chemical engineering, chemistry, electrical and mechatronic engineering, biotechnology, geology, and analytical chemistry. The selection of research topics is informed by divisional research priorities.

As part of the placement process, 15 employees from Support Services have been awarded bursaries to further their studies to assist them in meeting the minimum requirements of their roles.

We are proud to report that several staff members have completed their studies, including one Doctorate, four Master's degrees, three Honours degrees, and two Postgraduate Diplomas.

Five employees fulfilled the condition of studying as a requirement for their placement and successfully completed their respective studies.

“During the 2022/2023 period, Mintek awarded 47 bursaries (38% male, 62% female) in the SET pipeline to undertake postgraduate degrees in various fields of science and engineering. This includes 14 Doctorates, 30 Master's degrees, and 3 Postgraduate diplomas”.

5.4 Internship Programmes

Mintek implements internship programmes in partnership with organisations such as the Mining Qualifications Authority (MQA), the Department of Science and Innovation (DSI), Human Science Research Council (DSI-HSRC), the National Research Foundation and the South African Agency for Science and Technology Advancement (SAASTA). In collaboration with the Tshwane University of Technology (TUT) and the Vaal University of Technology (VUT), Mintek hosts Work Integrated Learners (WIL), providing valuable learning opportunities and practical work experience.

5.5 Coaching and Mentoring

As a further investment in the development of our employees, Mintek launched a coaching and mentoring programme. This programme aims to offer guidance and support, showcasing our commitment to their growth and advancement. We are grateful for the funding received from MQA to support this initiative.

5.6 Safety, Health, and Well-being of Our People

At Mintek, the safety, health, and well-being of our employees and stakeholders are of paramount importance. We firmly believe that prioritising safety, promoting proactive health practices, and nurturing holistic well-being establish a strong foundation for sustainable success. Through the implementation of robust policies, rigorous training programmes, accessible facilities, and continuous support systems, we strive to create a culture of safety, wellness, and personal growth. Our comprehensive approach covers various areas, including occupational health and safety, mental and physical wellness programmes, emergency preparedness, and more.

5.7 Mintek Occupational Health and Wellness

Our occupational health and wellness services provide comprehensive healthcare for Mintek employees and contractors while on duty. Recognising that workers spend a significant amount of time in the workplace, where they may be exposed to hazards, we ensure their fitness for work and protect their health within their work environment.

Occupational Health initiatives include:

- Medical surveillance programmes (entrance, periodic, exit, and executive medicals)
- Medical surveillance testing: Audiometry, Spirometry (lung function test), biological monitoring
- Injuries on duty (IOD)
- Non-occupational health services (primary healthcare, wellness screenings, etc.)
- Employee Wellness Programme (EWP)

Through these initiatives, we create an environment where our employees and stakeholders can thrive, knowing that their safety and well-being are our top priorities.

Bottom left: The Cynoprobe units are developed, assembled and tested at Mintek before shipment.

Middle and Bottom right: Training programmes are offered at Mintek to support the development of skills in artisanal small-scale mining and diamond and jewellery manufacturing.



5.8 | Notable Achievements and Accolades

Mintek proudly acknowledges the remarkable achievements and recognition received by our esteemed team members, who consistently demonstrate expertise and dedication in their respective fields.

These accomplishments exemplify Mintek's commitment to fostering a culture of excellence and innovation. We extend our heartfelt congratulations to the following individuals:



Prof Lucky Sikhwivhilu,

Chief Scientist in the Advanced Materials Division

Prof Lucky Sikhwivhilu, Chief Scientist in the Advanced Materials Division, was appointed as the Deputy Chairperson of the Research Advisory Committee of the Oliver R Tambo African Research Chair Initiative (OrTARChI) at Copperbelt University (CBU) in Kitwe, Zambia. This appointment will facilitate collaborative solutions to pressing environmental challenges in partnership with CBU and local Zambian copper mines, further strengthening Mintek's commercial presence in Zambia.



Dr Lodewikus Coetzee,

Executive Manager of the Measurement and Control Division

Dr Loutjie Coetzee, Executive Manager of the Measurement and Control Division (MCD), was elected President of the South African Council for Automation and Control (SACAC) at the Annual General Meeting (AGM) that was held in May 2023. SACAC is the National Member Organisation for South Africa to the International Federation of Automatic Control (IFAC). The primary mission of SACAC is to promote the multi-disciplinary science of computation, automation and control and their application to industry in Southern Africa.



Dr Nikiwe Mhlanga,

Principal Scientist in the Advanced Materials Division

Dr Nikiwe Mhlanga, Principal Scientist in the Advanced Materials Division, was awarded the prestigious Fulbright Postdoctoral Scholarship through the Fulbright South African Research Programme (SARSP – 2022/2023) at the Massachusetts Institute of Technology (MIT), Cambridge, MA, USA. Dr Mhlanga's research at MIT's Microfluidics and Nanofluidics Research Laboratory will contribute to advancements in healthcare, energy systems, and biochemical analysis.



Dr Quinn Reynolds

Senior Technical Specialist in the Pyrometallurgy Division

Dr Quinn Reynolds was elected to the Organising Committee for the Advances in Pyrometallurgy-Developing Low Carbon Pathways symposia hosted by the Minerals, Metals and Materials Society (TMS) conference in San Diego, California, USA. Dr Reynolds was elected to the South African Association for Theoretical and Applied Mechanics (SAAM) EXCO board and re-elected to the Steering Committee for the NICIS Centre for High-Performance Computing Annual Conference.

These achievements reflect the calibre of talent within Mintek and exemplify our commitment to advancing knowledge and innovation in the industry. Mintek remains dedicated to fostering a capable workforce, ensuring the safety and well-being of our people, and achieving excellence in our endeavours. Through strategic initiatives, investments in education and development, and a culture of continuous improvement, we position ourselves as a leader in the field of mineral solutions, driving innovation and making a positive societal impact.



6

Advancing Society through Science: Our Sustainable Development Initiatives

Introduction	44
Supporting Artisanal and Small-Scale Miners	44
Developing Capacity in the Mineral Sector	44
Science and Environmental Sustainability	45

Digested chemical samples prepared for ICP-OES analysis.



Left: Some delegates from the Mozambique National Mining Institute who attended a training course on small-scale mining at Mintek.

6.1 Introduction

At Mintek, we are deeply committed to catalysing change and actively participating in a variety of innovative initiatives that not only address pressing social and environmental challenges but also promote economic development in communities. Through our collective efforts, we strive to make a meaningful societal impact and create a better future for all. This chapter explores the initiatives that demonstrate Mintek's dedication to shaping a more inclusive, sustainable, and prosperous world. By actively engaging in these initiatives, we aim to drive positive change and contribute to the advancement of society as a responsible entity.

6.2 Supporting Artisanal and Small-Scale Miners

On 30 March 2022, the South African Government, through the Minister of the Department of Mineral Resources and Energy (DMRE), Hon. Samson Gwede Mantashe, MP, published the Artisanal and Small-Scale Mining Policy, 2022 for implementation in terms of the Mineral and Petroleum Resources Development Act 28 of 2002. The policy's objective is to foster the creation of a formalised Artisanal and Small-Scale Mining Industry that can operate optimally in a sustainable manner, thus creating an enabling environment for the industry to contribute to socio-economic development and improve the livelihoods of South Africans. In particular, rural communities and historically disadvantaged persons.

Fittingly, Mintek, as an implementing agency of the DMRE, carried out the following programmes and projects in support of the implementation of the Artisanal and Small-Scale Mining Policy 2022.

Supporting Women Miners

Mintek is proud to have implemented the Women Diggers Programme (WDP), a transformative initiative aimed at empowering women in the mining sector. Launched in 2019 by the Department of Mineral Resources and Energy (DMRE), this

programme focuses on equipping women with the necessary skills to thrive in small-scale mining operations and increase their representation in the mineral and mining sectors and the mainstream economy.

Through the programme, Mintek has trained 200 women from six (6) provinces across South Africa. As part of the programme, participating women had the opportunity to gain practical exposure through partnerships with leading mining companies. These invaluable experiences have allowed them to apply their newly acquired skills in real mining operations, thus further enhancing their capabilities and readiness for the sector.

Supporting Barberton Artisanal Miners in Sustainable Gold Extraction

Mintek collaborated with Above Average Mine in Barberton to introduce the iGoli™ process to a group of artisanal miners in Barberton.

The iGoli™ process is a gold extraction method specifically designed to provide artisanal miners with a safer and more efficient alternative to the traditional process involving mercury. By promoting the use of the iGoli™ process, Mintek aims to contribute to environmentally sustainable mining practices while promoting the well-being of artisanal miners.

6.3 Developing Capacity in the Mineral Sector

Empowering Entrepreneurial Ventures in Partnership with Lepharo Incubator

Mintek has formed a strategic partnership with Lepharo Incubator, a business incubator in Springs, Ekurhuleni. Established in 2006, Lepharo Incubator has provided invaluable support to aspiring entrepreneurs through its comprehensive range of business, technical training, mentoring, and access to incubation facilities.

This collaboration leverages the strengths of both organisations, with Mintek's technical expertise complementing Lepharo Incubator's proven track record in nurturing and guiding entrepreneurial ventures.

The partnership fosters a culture of knowledge sharing, collaborative projects, and joint initiatives that promote innovation and entrepreneurship. By combining Mintek's cutting-edge research capabilities with Lepharo Incubator's supportive environment, we aim to empower budding entrepreneurs and cultivate a dynamic ecosystem for technological advancements.

Empowering Mozambican Small-Scale Miners

Mintek was privileged to conduct a comprehensive two-week training intervention for a delegation from Mozambique's National Mining Institute (Instituto Nacional de Minas) (INAMI). The training focused on critical aspects of mine planning, the intricacies of small-scale mining, the significance of legal compliance, codes of practice to ensure that mining activities in Mozambique align with national regulations and international standards, and the innovative iGoli™ extraction and processing method.

The primary objective of this training intervention was to enhance capacity and expertise within the Mozambican mining sector. By collaborating with Mintek, INAMI aimed to leverage our extensive knowledge and experience to develop the skills of their mining professionals, thereby contributing to the sustainable growth and development of the sector in Mozambique.

6.4 Science and Environmental Sustainability

Mintek maintained its commitment to environmental protection programmes throughout the 2022/23 financial year. Our approach integrates the principles of sustainable development into all activities and functions as a fundamental element. We also take responsible measures to ensure that our operations do not contribute to environmental degradation, monitoring high-risk activities and implementing a wide range of measures to safeguard the environment. These measures are integrated into our risk management processes and Mintek's comprehensive Safety, Health, Environment, and Quality (SHEQ) system.

Key elements of our environmental protection efforts include meticulous management of water and

energy usage, effluent discharge, air emissions, and waste management. We prioritise the waste lifecycle, focusing on reduction, reuse, recycling, recovery, and treatment before disposal. As Mintek's work generates various types of waste, including potentially hazardous materials that could pollute the environment, effective environmental protection programmes necessitate close collaboration between the organisation and its employees.

Mintek has a waste management procedure that guides our waste handling practices, and our waste management contractor adheres to this procedure, providing an integrated service for waste sorting, collection, treatment, disposal, and recycling.

Mintek acknowledges that South Africa is a water-scarce country and recognises the importance of all citizens, including corporate entities, playing a significant role in conserving this scarce resource. Therefore, we closely monitor and track the impact of our daily activities on water resources. Freshwater is used as a primary input for our operations, while recycled water is used for irrigation. Our test works consume water, and the resulting effluents undergo treatment before being discharged into the main sewer.

Within this context, Mintek strives to maximise water recycling and ensures that discharged effluents do not contaminate natural water sources. Borehole water is utilised for garden watering.

Mintek remains fully committed to environmental responsibility, incorporating sustainable development principles into our operations and actively contributing to the conservation of water resources. Through our comprehensive environmental protection initiatives, we aim to minimise our environmental impact and promote a sustainable future.

Right: A woman miner being trained by a Mintek instructor.





7

Performance Information

Introduction	48
Strategic Objective 1: Conduct Relevant, Applied Research and Technological Innovation	48
Strategic Objective 2: Foster Industry Establishment and Expansion	49
Strategic Objective 3: Developing a Capable Workforce	50
Strategic Objective 4: Develop and Maintain a World-class RDI Infrastructure	52
Strategic Objective 5: Ensure Financial Sustainability	53

7 | Performance Information



Top: Material structure is analysed and measured using an X-ray diffractometer in the Mineralogy Division.

Right: iGoli™ process is piloted in Barberton to empower artisanal miners.

7.1 | Introduction

The Board of Directors enters into a Shareholder Compact agreement with the Minister of Mineral Resources and Energy annually. The Shareholder's Compact contains Key Performance Indicators (KPIs), a long-term strategic plan, and a detailed operational plan. Regular quarterly reports submitted to the DMRE are the primary means of monitoring performance against the established KPIs. The following section outlines the progress towards achieving the five strategic objectives and targets set for the 2022/23 financial year. The Auditor-General of South Africa (AGSA) provides reasonable assurance on performance information once the audit procedure is concluded.

7.2 | Strategic Objective 1: Conduct Relevant, Applied Research and Technological Innovation

Mintek maintained its exceptional performance in Scientific and Technical outputs and produced 69 journal papers, exceeding the target of 40. The overachievement can be attributed to various programmes and initiatives implemented at Mintek to strengthen and increase the Science, Engineering, and Technology (SET) staff complement to deliver on our strategic objectives and KPIs more effectively. This has included a focused recruitment drive to strengthen capacity in critical technical functions, leveraging postdoctoral research candidates and postgraduate interns to develop new areas of expertise and facilitate the execution of

projects, and providing research funding and bursaries to staff to enable them to upgrade their qualifications to a postgraduate level.

Mintek published 45 conference papers, exceeding the target of 40, mainly due to attendance at all planned conferences and subsequent publication of conference papers as per conference proceedings. With respect to knowledge generation, we published seven (7) book chapters, exceeding the target of five (5). Owing to the slower than anticipated progress with the publishing process for the Advanced Materials Division (AMD) led book that was earmarked for publication in Quarter 4, we did not meet our target for books (0/1). The earmarked book will tentatively be centred on nanotechnology-inspired applications in health, water, energy, and other applications and will be published in the 2023/24 financial year.

We succeeded in meeting our target for invention disclosures (10/10). Due to the lack of new inventions that meet the strict patenting criteria set by the Mintek Office of Technology Transfer (MOTT), our target on new patents (0/4) was not met. We are reviewing the iGoli technology, based on a chloride patent filed in 2001. The process has seen several developments and improvements, especially in the last three years. It has expanded to include the leaching of PGMs and base metals. An application for a patent entitled "A Composite Material and a Method to Prepare the Composite" is still ongoing in several regions of Europe. Due to administrative delays in filing trademarks, we did not meet our target (3/5) by the end of the financial year.

Table 1: Mintek Performance: Conduct Relevant, Applied Research and Technological Innovation

Key Performance Indicators	Annual Target 2022/23	Actual Achievement 2022/23
Number of journal papers	40	69
Number of conference papers	40	45
Number of book chapters	5	7
Number of books	1	0
Number of invention disclosures	10	10
Number of new patents	4	0
Number of trademarks	5	3

7.3 | Strategic Objective 2: Foster Industry Establishment and Expansion

Mintek exceeded the target for income from the sale of products & services, royalties, and licenses by over 21%, earning R149.74 million against a target of R123.7 million, mainly due to the higher than anticipated completion of projects, which placed additional pressure on divisional resources and delivery timeframes. The target for the number of IP licences (0/1) was not met, but Mintek is exploring opportunities with Above Average Mine for the licensing of iGoli™ technology. A Memorandum of Understanding (MOU) has been shared, and depending on the success of the current pilot campaign, options to license the iGoli™ technology will be further explored.

We successfully produced four (4) certified reference materials in line with the annual target of four (4). This target forms part of the quality control in the analysis of minerals locally and internationally. Due to delays in acquiring supporting letters from

our industry partners in the field of advanced materials, we could only met 90% of the target on the number of accredited methods (18/20).

We fell slightly behind delivery against the number of new products, services, prototypes, processes, and/or models demonstrated. The erratic power supply caused by the current levels of Load shedding affected the scheduling of large-scale demonstration work. Not all the laboratories are on backup power due to the load that this will put on the emergency generators. The proposed model that was based on the thermochemical (mass and energy) predictive model, which was designed to augment the demonstration of the PreMa process, also failed to meet the minimum TRL thresholds and could not be claimed as a functional model.

Table 2: Mintek Performance: Foster Industry Establishment and Expansion

Key Performance Indicators	Annual Target 2022/23	Actual Achievement 2022/23
Number of new products, services, prototypes, processes, and/or models demonstrated/ validated in a relevant environment	15	12
Income from the sale of products & services, royalties and licences (Rm)	123.7	149.74
Number of IP licences	1	0
Number of certified reference materials	4	4
Number of accredited methods developed and maintained	20	18



Left: The new smelting furnace under construction at Mintek.

Middle: A metal ring is stamped in the jewellery training workshop to ensure consistent metal quality and weight.

Right and far right: Pressure leaching facility for metallurgical testwork and NICMeR™ Low-fouling ultrafiltration membranes developed at Mintek for use in wastewater treatment.

7.4 Strategic Objective 3: Developing a Capable Workforce

The total headcount at Mintek as of the end of the financial year was 527 permanent staff, which excludes all learners. Sixty-seven of the 527 employees are on fixed-term contracts. Currently, 239 of the staff complement are SET. We made significant progress in the area of Developing a Capable Workforce with various programmes and initiatives implemented to strengthen and increase the Science, Engineering, and Technology (SET) staff complement to deliver on our strategic objectives as well as develop a sustainable pipeline of young talent.

Mintek is proud to have exceeded the target for the number of SET staff with doctoral degrees (81/61) and the percentage of SET staff with doctoral degrees (34%/26%). Over the course of the year, Mintek's SET cohort in possession of a PhD increased by 22, from 59 at the end of FY2021/22 to 81 in Quarter 4 of FY2022/23, exceeding the target of 61. The SET cohort of 81 is made up of 54 males and 27 females. This notable growth of 37% in staff possessing PhDs was achieved by targeted recruitment in senior positions and the absorption of staff on contract and those on Mintek and NRF-funded postdoctoral fellowships.

We achieved 99% of our target for a total number of SET employees (239/240) and fell slightly short in the percentage of Black SET staff (77%/80%), percentage of Female SET staff (49%/55%), number (60/79) and percentage (25%/34%) of SET staff with Master's degrees. The total number of SET staff at middle and senior levels was slightly below the target (102/118), and the percentage of Black SET staff at middle and senior levels was also not met (59%/82%). The external economic environment, including the competitive National System of Innovation (NSI), is a major contributing factor to this performance.

We are seeing improvements in the impact of our recruitment efforts, which are strongly focused on senior staff who will naturally come with the requisite MSc and/or PhD qualifications. This should significantly remediate some of the missed targets. During the financial year, we made 15 appointments (10 males and 5 females) in the middle and senior levels (SP, MP and SE), 8 have PhDs, 7 have Masters, 3 are Head of divisions, 1 Senior Technical Specialist, 2 Principal Scientists, 4 Senior Scientists, 1 Principal Engineer and 4 Senior Engineers. We remain committed to building and retaining a staff base with the requisite qualifications, skills, and capabilities to identify, lead, and pioneer new avenues of discovery and innovation critical to the realisation of the Mintek Strategy 2030.

Table 3: Mintek Performance: Conduct Relevant, Applied Research and Technological Innovation

Key Performance Indicators	Annual Target 2022/23	Actual Achievement 2022/23
Total number of SET employees	240	239
Percentage of Black SET staff	80%	77%
Percentage of Female SET staff	55%	49%
Total number of SET staff with doctoral degrees	61	81
Percentage of SET staff with doctoral degrees	26%	34%
Total number of SET staff with Master's degrees	79	60
Percentage of SET staff with Master's degrees	34%	25%
Total number of SET staff at middle and senior levels (SP, MP and SE)	118	102
Percentage of Black SET staff at middle and senior levels (SP, MP and SE)	82%	59%



Far left: Button Arc Furnace is used for melting of metal powders into solid metal buttons.

Left: South-West view of the Mintek campus.

Right: The water nanotechnology laboratory at Mintek.

Far right: A scientist is analysing a sample in the Advanced Materials Division.

7.5 Strategic Objective 4: Develop and Maintain a World-class RDI Infrastructure

All SHEQ targets were achieved at the end of the financial year. There were no lost time injuries reported as a result. Mintek's Lost Time Injury Frequency Rate (LTIFR) remained at 0.6. No significant health, environmental, or public complaints incidents were reported during this period. Mintek's CSFR was at 97% at the end of the financial year.

Due to delays in the procurement of assets caused by the requirement to align policies and processes as a result of changes in the Preferential Procurement Regulations, we did not

meet our target in respect of total investment in plant, property and equipment (R13.00m/R47.9m). Mintek is putting tight measures in place to improve the delivery of infrastructure and expenditure of the budget planned for the financial year. Due to fewer human capital development programmes rolled out owing to restrictions on awarded bursaries during the year, we did not meet our target for investment in human capital (R8.45m/R11.8m) (<50% awarded). The intent to elevate the qualifications profile of supporting functions in the next financial year will assist in improving our investment target for this KPI. We fell slightly behind target for the number of accredited facilities maintained (3/5), which can be attributed to delays in the accreditation of ISO 17034, which was planned for the current financial year. The SANAS assessment will be completed in Quarter 1 of FY2023/24.

Table 4: Mintek Performance - Develop and Maintain a World-class RDI Infrastructure

Key Performance Indicators	Annual Target 2022/23	Actual Achievement 2022/23
Total investment in plant, property and equipment (Rm)	47.9	13.00
Total investment in human capital (Rm)	11.8	8.45
Lost Time Injury Frequency Rate	<1	0.6
Client Satisfaction Rate	90%	97%
Number of accredited facilities maintained	5	3
Safety, Health, Environment and Quality	Maintain Accreditation	Accreditation Maintained

7.6 Strategic Objective 5: Ensure Financial Sustainability

Mintek receives funding from the DMRE monthly to fulfil its mandate. All funds received were applied to research activities. Financially, Mintek is in a strong position. We exceeded our target for Total Income (R649.50m/R590.1m) due to our continued efforts to drive the diversification of our income streams, largely driven by contract revenue (R134.36m), income from products & services (R137.96m) and income from contract research (R51.09m), which performed significantly better than expected during the year ended 31 March 2023.

We exceeded the target for the net result (R4.88m/R2.4m) due to higher commercial income generated and the ability to resolve most of the invoicing issues encountered in Quarter 3 with

project-related transactions on the new ERP System. Revenue generated from Contract R&D Income (R51.09m/R57.4m) was significantly lower than budgeted, mainly due to numerous challenges with project-related transactions being captured on the new ERP System. This adversely affected Mintek's reporting as revenue recognition forms a vital part of the entity's revenue base. There are ongoing consultations to resolve all ERP-related issues. We exceeded the target for BEE spend (97.42%/90%) due to significant spending on B-BBE Level 1 & 2 vendors.

Mintek maintains a strong balance sheet, and the liquidity ratio averages around 1.7:1. This remained unchanged from the audited figures of FY2021/22 and further highlights the organisation's stability. Mintek holds an unqualified audit record from the previous financial year. The external audit of the 2022/23 financial year is currently in progress by the Auditor General of South Africa (AGSA).

Table 5: Mintek Performance - Ensure Financial Sustainability

Key Performance Indicators	Annual Target 2022/23	Actual Achievement 2022/23
Total income, (Rm)	590.1	649.50
Net result, (Rm)	2.4	4.88
Contract R&D Income, (Rm)	57.4	51.09
BEE Spend as % of Procurement Spend	90%	97.42%
Audit opinion	Unqualified	Unqualified



8

Governance

Introduction	56
Mintek Governance Structure	56
The Mintek Board of Directors	57
Executive Management Committee	65
Statement	69
Governance Framework	69
Board Committees and Their Functions	69
Board and Committee Meeting Attendance	70
Remuneration Policy and Practices	71
Board Remuneration	71
B-BBEE Compliance Performance Information	72

8.1 Introduction

Mintek's corporate governance is more than just a set of policies, procedures, structures, regulations, and frameworks; it is a commitment to the highest governance standards, ethics, and integrity. The Board of Directors is committed to corporate governance by adhering to the concepts and procedures that allow Mintek to promote and foster healthy relationships with key stakeholders.

8.2 Mintek Governance Structure

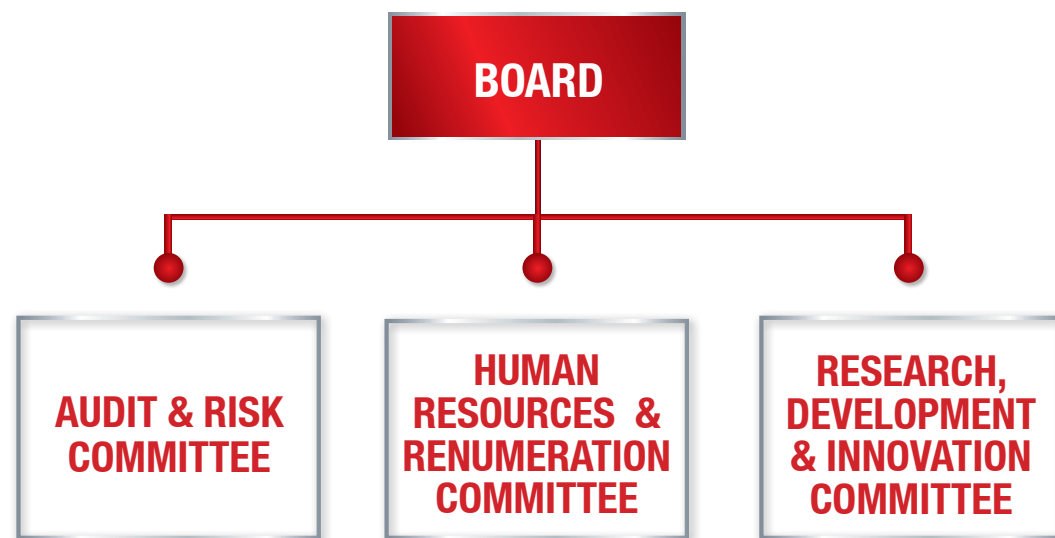
The Board oversees the organisation's operating model, business and risk strategy, regulatory compliance, and financial soundness. Except for the Chief Executive of Mintek, all members of the Board are independent non-executives.

The Board is accountable to the Minister of Mineral Resources and Energy, and, as a result, a shareholder performance agreement (the compact) has been concluded between the Board and the Executive Authority. Mintek has a Board Secretariat responsible for supporting the Board and ensuring optimal functioning and effectiveness.

As the accounting authority, the Board acknowledges that the principal objective of the corporate governance system is to ensure that both the Board and executive management fulfil their duties ethically and successfully.



The duties of the Board are outlined in the MTA (Mineral Technology Act), the PFMA (Public Finance Management Act), and the Board Charter. Board members exercise independent judgement in their participation and contribute to the Board's discussions and decision-making process. Its overall function is that of strategic leadership. Setting, monitoring, and reviewing strategic targets and objectives, approving capital expenditure, acquisitions, and disposals, and overseeing governance, internal controls, and risk management are all part of this. Three committees support the Board. The Board delegates certain functions to the committees while it remains fully accountable. This formal delegation process includes documented and approved terms of reference that are reviewed annually or more frequently as required.



Mintek has a clear separation of responsibilities between the leadership of the Board (the responsibility of the Chairman) and the executive management responsibility for the leadership of Mintek's business (the responsibility of the Chief Executive). Amongst others, the Board is also responsible for:

- ensuring that the technology and systems used in Mintek are adequate to run the business properly and for it to compete through the efficient use of its assets, process and human resources;
- ensuring that Mintek complies with all relevant laws, regulations and codes of best business practice;
- regularly assessing its performance and effectiveness as a whole and that of individual executives, including the Chief Executive Officer; and
- monitoring and evaluating the implementation of strategies, policies, management performance criteria and business plans; ensuring that procedures and practices are in place that protect Mintek's assets and reputation.

8.3 The Mintek Board of Directors

The Board is the Accounting Authority of Mintek. Its composition encompasses members with specialised experience and diverse skills, allowing the Board to provide informed counsel, rigorous oversight, and independent interrogation in the organisation's pursuit of integrated thinking. The Board provides independent and objective judgement; they constructively challenge and monitor the leadership's delivery of strategy within the Board-approved framework and risk appetite. The Minister of the Department of Mineral Resources and Energy has legislative authority over the composition of the Board, appointment, and/or dismissal of a Board member. During the reporting period, the Minister appointed two Board members: Dr Thibedi Ramontja as the Chairperson of the Board and Prof Lwazi Ngubevana as the Non-Executive Director.

The MTA requires the Board to have the Chairman, not fewer than six (6) but not more than nine (9) Non-Executive Directors (NEDs), and the Chief Executive Officer (CEO), who shall serve on the Board by virtue of his office. The MTA establishes "fit and proper" requirements for Board membership and prescribes that a panel evaluates nominated shareholder-elected candidates, considering experience, skills, relevant business acumen, knowledge, and diversity. This ensures that the Board functions with integrity and has the expertise and diversity of thought necessary to fulfil its governance responsibilities. To tackle the intricate decision-making processes, Board diversity is required to allow issues to be approached from the various perspectives of directors representing different cultural, racial, gender, and age groups.





Left: Mintek's Pyrometallurgy Division prioritises safety measures for furnace tapping operations.

Top Right: A water filtration plant used to filter out solids in mineral processing.

Bottom Right: A library image of Johannesburg Skyline.



The members of the Mintek Board and Committees, including their roles, are listed below:

Mintek Board Members

(Period: from 1 April 2022 to 31 March 2023)

Director	Date of Appointment	Category		Gender	Board	ARC	HR & Remco	RDIC
Total Numbers of Meetings					3	4	2	2
Dr T Ramontja	30/08/2022	Non-Executive Director		Male	Chairperson			
Ms PN Zikalala Mvelase	01/06/2020	Non-Executive Director		Female	Deputy Chairperson	Member	Chairperson	
Mr R Heydenrich	01/06/2020	Non-Executive Director		Male	Member			Member
Mr LL Makibinyane	01/06/2020	Non-Executive Director		Male	Member	Member	Member	
Ms P Maruping	01/06/2020	Non-Executive Director		Female	Member			Member
Mr H Motaung	01/06/2020	Non-Executive Director		Male	Member			Chairperson
Dr M Motuku	01/01/2019	Executive Director		Male	Member	Invitee	Member	Member
Ms NF Ngcwabe	01/06/2020	Non-Executive Director		Female	Member	Member		
Dr MW Ngobeni	01/06/2020	Non-Executive Director		Female	Member		Member	
Prof L Ngubevana	30/08/2022	Non-Executive Director		Male	Member		Member	Member
Ms MM Phiri	01/06/2020	Non-Executive Director		Female	Member	Chairperson		
Mr M Mokupo	21/06/2020	Independent Non-Executive Director		Male		Member		
Ms M Thomani	21/06/2020	Independent Non-Executive Director		Female			Member	

Profiles of Non-Executive Directors



Dr Thibedi Ramontja: MSc (Eng), PhD

Dr Thibedi Ramontja is an honorary adjunct professor at the University of the Witwatersrand's School of Mining Engineering. He supervises PhD and MSc students at the university and works as an independent consultant, providing valuable services to mining companies. With extensive technical expertise in the mineral and mining industry and a background in education, Dr Ramontja has contributed to various projects, including vanadium and magnesite ventures in Limpopo Province and a gold project in North West Province. He possesses a deep understanding of the entire mining value chain and brings valuable insights to research and development efforts.



Ms Ntombifuthi Zikalala Mvelase: B Proc, LLB

Ms Ntombifuthi Zikalala Mvelase is an admitted Attorney of the High Court and practices as an Associate Attorney at Friedrich Incorporated. She has served in various executive roles in public and private sectors, including State Diamond Trader, DMRE, Commission on Gender Equality, and Centre for Criminal Justice, including being admitted as an attorney in 1991. She serves on various Boards that include the Airports Company South Africa (ACSA), is Chairperson of the Human Resources, Remuneration and Nominations Committee at ACSA, Chairperson of the Board of JIA Piazza Park, which operates the InterContinental Hotel O R Tambo Hotel and Committee Member of various other Board Committees at ACSA. She is also a Board member of the South African Diamond and Precious Metals Regulator (SADPMR) and the Chairperson of the Board of the Limpopo Jewellery Business Incubator. She is also a guest lecturer at the Wits Law School, Wits University.



Mr Harold Motaung: BSc (Mining Eng), MBA, Blasting Cert.

Mr Harold Motaung is the former CEO and Director of Atlatsa Resources, a position he occupied from 01 April 2011 until July 2020. He is the Director of Northern Lights (Pty) Ltd. He is a Mining Engineer by profession with over 28 years of mining experience. Motaung progressed through the traditional mining ranks of a miner. Motaung was appointed to numerous Boards of government-associated institutions, including the National Nuclear Reactor. He was the Chairperson of Mintek and SAMREC Holdings, the controlling shareholder of Atlatsa.



Ms Margaret Mosibudi Phiri: BCom, BCompt (Hons), CA (SA)

Ms Margaret Phiri is a managing director at Mohale Seoka Consulting. She is also the CEO of Seoka Phiri Construction and Transportation. She is a qualified chartered accountant, registered auditor and tax practitioner with over 21 years of experience in the public and private sectors. She worked at the Auditor-General South Africa (AGSA) for twenty years and has extensive exposure to external auditing, including internal controls, control environment, Board evaluations, investigation, financial statements preparation and review, audit of performance information, corporate governance principles, IT governance and risk management. She is a member of the South African Institute of Chartered Accountants, Independent Regulatory Board for Auditors, Public Sector Audit Committee Forum and Institute of Directors SA.

Profiles of Non-Executive Directors



Mr Philippus Rudolf Heydenrich: B Eng (Chemical), M Eng (Chemical)

Mr Rudolf Heydenrich is the CEO of Heydenrich Consulting Pty (Ltd), a recognised leader in New Business Development, Research and Development, Technology Assessments, and Technology Transfer in the Energy and Chemicals sectors. Throughout his career, he has served on various divisional boards, advisory boards, and joint venture constructs. Heydenrich specialises in strategy development, translating strategies into tactical plans, and providing effective oversight to ensure successful plan implementation. His expertise and leadership have earned him a respected position within the industry.



Ms Pontsho Maruping: Dip. in Science Education, Dip. in Economic Geology, BSc Eng (Mineral Processing), BEng (Hons), Masters in Space Systems Engineering, MBA

Ms Pontsho Maruping is the Managing Director at the South African Radio Astronomy Observatory. Her experience spans the private and public sectors, with over ten years at an executive level. She was an executive at the Technology Innovation Agency responsible for Innovation Funding and Pre-commercialisation Support. Her major career highlights include coordinating the development of the National Nanotechnology Strategy, which was approved by Cabinet in 2006, and coordinating the development of the Health and Safety Culture Transformation Framework for the Mining Industry.



Dr Maropeng Ngobeni: PhD (Chemistry)

Dr Maropeng Ngobeni is a distinguished scientist at Sasol Research and Technology, bringing over 15 years of expertise in industrial research. With a primary focus on catalyst preparation and characterisation, Fischer-Tropsch synthesis, and refining, Ngobeni has made significant contributions to the field. Holding a PhD Degree in Chemistry, his qualifications and experience demonstrate his deep understanding and knowledge in the area of study.



Ms Ntokozi Faith Ngcwabe: BA (Geography), BA (Hons) (Geography and Environmental Management), LLB

Ms Ntokozi Faith Ngcwabe is the Deputy Director General: Mineral Policy and Promotion at the DMRE. She is an experienced researcher on global competitiveness and the attraction of new investment. Ngcwabe participated in the drafting and publishing of the Mineral and Petroleum Resources Development Act of 2002. She represented South Africa at the United Nations Environmental Initiatives and other government-related government engagements overseas, including the Kimberly Process Certification Scheme. She also served as a Board member at the State Diamond Trader between 2009 and 2011.

8.4 Executive Management Committee

The Executive Management Committee comprises the Chief Executive and four (4) Group Executives, who play pivotal roles in driving research and technology development, leading business growth initiatives, providing effective people leadership, and ensuring the organisation's financial well-being. They form a cohesive team that guides and shapes the company's strategic direction.

The Chief Executive Officer's primary responsibilities include leading the formulation and implementation of the Board-approved strategy, approving and monitoring business plans, maintaining stakeholder partnerships, and providing high-level executive leadership. The committee is also responsible for Mintek's budget, operating structure, administrative policies, and key procurement processes. Additionally, the Executive Management Committee ensures that governance procedures are established to allow proactive corporate governance systems to be assessed regularly to maintain soundness and compatibility with world-class standards.



Prof Lwazi Ngubevana: BSc Eng (Chemical), MBA, PhD (Chemical Engineering)

Prof Lwazi Ngubevana is the African Energy Leadership Centre Director at the Wits Business School. He holds a PhD in Chemical Engineering and an MBA from the University of the Witwatersrand. His career spans 17 years in the energy, mining, minerals, and water sectors. He has held engineering, project management, and executive roles locally and internationally. His diverse experience encompasses energy policy and legislation, environmental management strategy, and working for the world's largest water desalination company.



Mr Lefadi Makibinyane: B Eng (Hon), MDP (Project Management), MBL, MIChemE, MloDSA, Chartered Engineer

Mr Lefadi Makibinyane is a registered Chartered Engineer and Member of the Institute of Chemical Engineers with over 30 years of working experience. Makibinyane has served on various boards of Public and Private Entities since 2003, including the Board of Council of Geoscience, and later Rand Water, Construction Industry Development Board, Gauteng Partnership Fund, Sandspruit Water Works, Consulting Engineers South Africa, Consulting Engineering Export Council, Green Built Council of South Africa, Amatola Water and the Presidential Broad-Based Black Economic Empowerment Council.

He has over 15 years of Executive Management experience and over 19 years Non-Executive Director experience. His highest achieved positions were Chief Executive Officer of Amatola Water and Consulting Engineers South Africa. He serves on the Boards of MINTEK, Rand Water, the Audit Committees of the National Department of Cooperative Governance, and the Municipal Infrastructure Support Agency.

Top Left: Heap leaching simulated in a short column in the Biometallurgy Division.

Bottom Right: South-West view of the Mintek campus.



Profiles of Executive Directors



Dr Molefi Motuku: BSc (Physics), BSc (Mechanical Engineering), MSc (Materials Engineering), PhD (Materials Engineering)

Dr Molefi Motuku is the current CEO of Mintek. With a wealth of leadership experience, he has held various positions, including Group Executive: Research, Development, Innovation, and Acting CEO at the Council for Scientific and Industrial Research (CSIR), as well as CEO of the National Metrology Institute of South Africa (NMISA). Before his tenure at NMISA, Dr Motuku successfully managed the Advanced Materials Division at Mintek and served as General Manager: Research & Development; Director of Fort Hare Institute of Technology (University of Fort Hare), and an Assistant Professor of Mechanical & Materials Engineering at Tuskegee University, USA. He was a member of the American Society of Mechanical Engineers (ASME) and The Minerals, Metals & Materials Society (TMS) in the USA. He holds a PhD and MSc in Materials Engineering from the University of Alabama at Birmingham (UAB), USA. Dr Motuku is an accomplished author and has made significant contributions through presentations at numerous international conferences and forums.



Mr Sakhi Simelane: BCom (Accounting), BCom Hons (Accounting), MBA

Mr Sakhi Simelane is Mintek's CFO/Group Executive: Support Services. He has extensive experience in Accounting and Auditing, previously holding positions such as Chief Financial Officer of the Department of Minerals and Energy and Chief Audit Executive at the South African Revenue Service. He has received accolades for his work, including being named Internal Auditor of the Year (SA) in 2004. He served as the Audit Committee Chair for The Economic Development Department and holds positions in various other government departments and organisations. Mr Simelane holds an MBA from Regenesys and a BCom (Hons) degree.



Ms Mariekie Gericke: BSc (Microbiology & Chemistry), BSc (Hons) (Microbiology), MSc (Microbiology)

Ms Mariekie Gericke is a distinguished scientist with a strong background in biohydrometallurgy and the treatment of mining-related water and waste. She began her career at the CSIR before joining Mintek in 1995. With a BSc in Chemistry and Microbiology, an Honours degree in Microbiology, and an MSc in Microbiology, Ms Gericke has actively contributed to research and development through collaborative projects with industry and research partners. She was Divisional Manager for the Biometallurgy Division before becoming the Group Executive for Extractive Metallurgy at Mintek in 2022. Ms Gericke's expertise is showcased through her publications, book chapters, and presentations at local and international conferences in the field of biometallurgy.



Prof Indresan Govender:
BSc (Physics & Mathematics),
BSc Hons (Physics),
HDE (Maths & Physics),
PhD (Mechanical Engineering)

Prof Indresan Govender has over 20 years of R&D experience. He joined the organisation with a strong track record that spans the complete value chain of mineral processing research. Prof. Govender graduated with a PhD from the University of Cape Town (UCT), where he worked for 15 years in Physics and Engineering. He then joined the University of KwaZulu-Natal (UKZN) as a Professor of Particle Technology and Mineral Processing. Mechanistic modelling of mineral processing unit operations has uniquely positioned Prof Govender's research to offer robust and practical solutions to the mining industry while ensuring that the underlying physics is correctly captured.



Dr Jones Papo:
BSc (Chemistry & Mathematics), MSc
(Applied Science in Materials Engineering), MSc
(Materials Engineering), PhD
(Materials Engineering)

Dr Jones Papo is the Group Executive: Mining Materials and Automation at Mintek. He holds a BSc in Chemistry & Mathematics and an MSc in Applied Science in Materials Engineering from the University of Cape Town. He completed his Master of Science (MSc) and PhD in Materials Engineering at the University of Alabama at Birmingham as a Fulbright Scholar. Dr Papo has worked on various research programmes, including the Metals Affordability Initiative consortium led by the US Department of Defence and a National Institutes of Health-funded project on Nanocrystalline Diamond Coatings for Medical Implants. He joined Mintek in 2004 and has held positions as Chief Scientist, Head of Physical Metallurgy and Manager of the Advanced Materials Division. His current focus is on technology transfer and the commercialisation of R&D outcomes.

8.5 | Statement

The Board hereby considers Mintek's annual financial statements to be a fair depiction of the organisation's financial position at year-end in terms of the South African Statements of Generally Recognised Accounting Practice (GRAP) and as required by the Public Finance Management Act (PFMA).

8.6 | Governance Framework

Mintek seeks to ensure that business processes, systems, and controls adhere to governance principles while ensuring corporate efficiency in accordance with universal best practices. As a science council, the organisation plays a significant role in South Africa's research, innovation, service delivery, development, and growth.

We operate within the framework of a variety of relevant legislation. These are:

- The Mineral Technology Act No. 30 of 1989;
- Mintek is regulated by the PFMA, which also governs its undertakings as a Schedule 3B organisation;
- The King IV Report, which intends to promote best practices in corporate governance across organisations, applies to

Audit and Risk Committee (ARC)

The ARC covers all aspects of the PFMA and the Auditing Standards outlined in the regulations. The Committee conducts a final review of the organisation's critical risk issues, such as asset maintenance and safeguarding, as well as financial sustainability. It oversees the effectiveness of internal financial controls, along with external and Internal Audit operations, to ensure the financial statements' integrity.

The ARC supports the Board in discharging its responsibilities relating to:

Committee Objectives	Highlights of Activities
<p>Effectiveness and efficiency of operations;</p> <ul style="list-style-type: none"> • Compliance with applicable laws, regulations and supervisory requirements; • The operation of adequate systems and control processes. • Oversee and provide advice on the organisation's risk management; • Evaluate the effectiveness of mitigating strategies implemented to address the material risks of the organisation; • Supporting Mintek's business sustainability under normal as well as adverse operating conditions; • The preparation of accurate financial reporting and statements in compliance with all applicable legal requirements and accounting standards; and 	<ul style="list-style-type: none"> • Approved the revised ARC & Internal Audit Charters for 2023. • Actively interacting with the acting Head of Internal Audit and external service provider Lunika in ensuring that the Internal Audit strategic plan for 2022/23 is practical and achievable. • Approved and recommended the Mintek annual strategic risk register for final approval by the Board. • Monitored that the risk register is reviewed on a continuous basis for any emerging risks and provided regular feedback to the Board on the adequacy and effectiveness of risk management. • Approved and recommended the Mintek Shareholder Compact 2023/24, including sections dealing with the group financials and risk management for final approval by the Board. • Approved and recommended the 2022/23 Annual Integrated Report.

public entities and public enterprises that fall under the PFMA; and

- The Governance Protocol provides guidelines to the public sector and its institutions working in the political and economic spheres. Although the Protocol applies to Mintek, it is not intended to replace the King Code but rather to supplement it. Boards are the fundamental foundation of corporate governance, according to the Protocol, and Mintek must be led and regulated by an effective and efficient Board formed in accordance with the Mineral Technology Act.

8.7 | Board Committees and Their Functions

Three well-constituted committees support the Board in carrying out its duties. The Board receives reports on governance and oversight matters from the committees. These committees are selected according to the skill sets required to fulfil their functions. The three committees are the Audit and Risk Committee (ARC), the Human Resources and Remuneration Committee (HR & Remco) and the Research, Development and Innovation Committee (RDIC). Each of these committees has its own charter.

Human Resources and Remuneration Committee (HR&Remco)

HR & REMCO develops and monitors policies and values-based processes to guarantee that the organisation's operations comply with labour laws and industry best practices. It assures that the organisation's remuneration policies and strategies are designed to recruit, retain, and motivate the best employees.

Research, Development and Innovation Committee (RDIC)

RDIC ensures that core research and innovation processes are carried out ethically, effectively and in accordance with international best practices and that research outputs, organisational climate and credibility remain compatible with the role and objectives of the organisation. Advises on the utilisation of expertise, project proposals and financing thereof, looking into various cooperatives and related strategies and the possible expansion of the organisation's business within the said mandate.

8.8 Board and Committee Meeting Attendance

The Board meets at least four times a year. Circumstances might arise and necessitate ad hoc meetings to deliberate on urgent, substantive matters. The Board reserves at least one day per year to discuss the long-term strategic plan of the organisation and its subsidiaries. All members of executive management attend Board meetings. Furthermore, selected members of executive management and senior management participate in committee meetings.

Board and Committee Meeting Attendance (1 April 2022 to 31 March 2023)				
Name of Directors and/ or Committee Members	Scheduled			
	Board	ARC	HRC & Remco	TC
Total number of meetings	*7	**9	***5	4
Dr Thibedi Ramontja (<i>appointed 30/08/2022</i>)	4/7	n/a	n/a	n/a
Ms Ntombifuthi Phydelsi Zikalala Mvelase (<i>Deputy Chair</i>)	7/7	9/9	5/5	n/a
Mr Rudolf Philippus Heydenrich	6/7	n/a	n/a	4/4
Mr Lefadi Lucas Makibinyane	6/7	9/9	5/5	n/a
Ms Pontsho Maruping	6/7	n/a	n/a	3/4
Dr Molefi Motuku	7/7	5/9	4/5	3/4
Mr Harold Motaung	6/7	n/a	n/a	4/4
Dr Maropeng Ngobeni	7/7	n/a	5/5	n/a
Ms Ntokozi Faith Ngcwabe	4/7	4/9	n/a	n/a
Prof Lwazi Ngubevana (<i>appointed 30/08/2022</i>)	4/7	n/a	3/5	2/4
Ms Margaret Mosibudi Phiri	7/7	9/9	n/a	n/a
Ms Mavis Thomani	n/a	9/9	n/a	n/a
Mr Pascal Mokupo	n/a	9/9	n/a	n/a

* Board had three special meetings to approve the reports.

**ARC had five special meetings to approve and recommend reports to the Board for final approval.

***HR & REMCO had a special meeting to recommend the report to the Board.

The meetings of the Board and committees are held in an atmosphere of intellectual honesty, candour, and mutual respect. These meetings necessitate executive management reporting of the highest calibre and rigorous and constructive challenge and debate among all Board and committee members.

8.9 Remuneration Policy and Practices

A rigorous analysis informs Mintek's remuneration strategy and practice of environmental remuneration trends. Despite the tough competition created by mining industry remuneration practices, Mintek strives to maintain a fair, robust and appropriate remuneration and rewards practice for its employees, augmented by other interventions to improve staff motivation and retention.

The determination of Mintek's remuneration strategy and policy is among the duties of the Human Resources and Remuneration Committee (HR&Remco) of the Board. The committee ensures that the remuneration policy framework supports the business's strategic aims and enables employee recruitment, motivation and retention at all levels while complying with all relevant regulatory and legal requirements.

Remuneration Policy

Mintek's Remuneration Policy applies to all Mintek employees appointed on a permanent, contract or casual basis. The policy shall serve as the foundation for determining an appropriate rate of pay for each job at Mintek, a rate of pay that is fair, consistent across all jobs, and competitive with market trends.

This policy applies in line with Section 10(1)(b) of the 1989 Mineral Technology Act, which requires the Board to determine conditions of employment, including the payment of remuneration, allowances, subsidies and other benefits, in accordance with a system approved by the Minister.

There were no changes to the remuneration policy during the period under review. The policy objectives remain the same: to implement a fair and just rewards and benefits system that does not discriminate based on race, gender, creed, or any other form of discrimination. It also advances the principles of fairness and equity in pay by promoting internal parity.

During the year under review, the effort to control Mintek's salary

cost continued. While management guarantees that Mintek employees are adequately compensated, it also ensures that the revenue and overall employee costs are in balance. As a result, a performance-based, one-time bonus has been included in the remuneration mix, which has no long-term impact on the amount of the salary bill. The salary bill's growth rate is kept within the inflation target range.

Other financial benefits

The basket of other employee benefits is a deliberate strategy adopted by Mintek to mitigate the risk associated with our inability to compete with the industry in terms of salary packages. The intention is to improve the quality of work life for the employees of Mintek while also improving organisational performance. This basket includes a generous study package comprising a comprehensive bursary scheme that includes transfer payments to academic institutions, purchasing of study materials and books, leave provision for attending classes, preparation for exams and consultation with supervisors for Masters' and Doctoral students.

8.10 Board Remuneration

The Minister of Finance sets the Board members' remuneration, published annually in the National Treasury's Service Benefit Packages for Office-Bearers of Certain Statutory and Other Institutions. The determination provides for a fixed daily rate that caters to meeting preparation and attendance. In addition, travel and subsistence costs are paid in line with Mintek's subsistence and travel policy.

8.11 B-BBEE Compliance Performance Information

The following has been completed in accordance with the compliance to the Broad-Based Black Economic Empowerment (B-BBEE) requirements of the B-BBEE Act, 2013 and as determined by the Department of Trade, Industry and Competition (DTIC).

Has the department/public entity applied any relevant Code of Good Practice (B-BBEE Certificate Levels 1 – 8) with regards to the following:		
Criteria	Response Yes/No	Discussion (include a discussion on your response and indicate what measures have been taken to comply)
Determine qualification criteria for the issuing of licenses, concessions or other authorisations in respect of economic activity in terms of any law?	No	This is not applicable to Mintek as the organisation does not issue licenses, concessions or other authorisations.
Developing and implementing a preferential procurement policy?	Yes	Mintek developed and implemented a procurement policy that incorporates the preferential procurement element, with the inclusion of a Transformation Plan that seeks to target black-owned and other designated group suppliers in Mintek's procurement spend.
Determining qualification criteria for the sale of state-owned enterprises?	No	This is not applicable to Mintek as we are not mandated to sell state-owned enterprises.
Developing criteria for entering into partnerships with the private sector?	No	There are no partnerships with the private sector. These transactions are governed by the PFMA.
Determining criteria for the awarding of incentives, grants and investment schemes in support of Broad-Based Black Economic Empowerment?	No	Not applicable in the 2022/2023 financial year.



Left: An open flame fusion process is used for preparation of solid samples for ICP-OES and UV analysis.

Bottom right: Lancing of a DC Arc Furnace taphole to remove molten material.

9 Risk Management

Introduction	76
Evolving Risk Management Practices at Mintek	76
Mintek Risk Universe	77
Summary of risks after implemented controls and residual risk rating	77

9.1 Introduction

The Mintek Board, aided by the Audit and Risk Committee (ARC), delegates responsibility to the management team for the establishment, execution, and monitoring of the risk management process. This also includes integrating risk management into the daily functioning of the organisation. Mintek has embraced leading standards to devise, evolve, and apply a risk management framework that accommodates and facilitates risks intrinsic to the Research, Development, and Innovation (RDI) value chain.

9.2 Evolving Risk Management Practices at Mintek

Risk management is guided by the Mintek Act, Public Finance Management Act, National Treasury Regulations, King IV Report on Corporate Governance, International Standard on Risk Management (ISO 31000), Committee of Sponsoring Organisations of the Treadway Commission (COSO Framework), and International Standards for the Professional Practise of Internal Auditing.

In the reporting period, Mintek embarked on a journey to overhaul risk management to achieve the following:

- A mindset shift from a compliance culture to an empowered, risk-aware, and risk-taking culture is characteristic of a research and development organisation.
- An elevation of the dialogue from operational risks to strategic risks.

- Appropriate constitution of the risk governance structure.
- Adoption of appropriate risk identification and assessment tools and processes.
- A risk register that is reflective of the core business of Mintek (research, technology development, and transfer of technology and services to industry).

It is envisaged that initiating these expectations will shift Mintek's risk management maturity to level two, progressing to the next level. The initiative towards the improvement of Mintek's risk management maturity will span over a number of years. Key milestones achieved in the financial year are the use of appropriate risk identification and assessment tools and processes, the elevation of the dialogue from operational risks to strategic risks and the risk registers that now reflect the core business of Mintek.

Mintek has three lines of defence elaborated as follows:

First Line	Second Line	Third Line
Risk Owners/ Managers	Internal Control, ICT Governance, ERM, SHEQ, Legal	Audit (Internal and External)
<ul style="list-style-type: none"> • Select and develop a balance of on-going and separate evaluations, considering the rate of change in business and business processes and varying the scope and frequency of separate evaluations depending on risk. • Ensure that evaluators performing on-going and separate evaluations have sufficient knowledge to understand what is being evaluated. 	<ul style="list-style-type: none"> • Performs ongoing and separate evaluations to monitor the status of various components of the system of internal control as directed by management. • Performs ongoing and separate evaluations to monitor whether achieving objectives is within established risk tolerances. 	<ul style="list-style-type: none"> • Provides assurance that ongoing management evaluations are built into business processes and adjusted to changing conditions as appropriate. • Provides assurance that information provided by management evaluations is fair and accurately presented. • Provides assurance that the system of internal control is operating as expected and risks are managed within the organisation's risk appetite and tolerance.

9.3 Mintek Risk Universe

Mintek has identified enterprise-level risk types and categories within its universe in its efforts to manage risks consistently.

Risk types and categories

Type	Strategic	Financial	Operational	Governance & Compliance	Safety, Health, Environment & Quality
Category	Technological Innovation Customer Business Model Project / Product Political Market and Industry Competition Reputational Organisational Strategy	Market Credit Liquidity	Human Capital Information Systems Property and Facilities Insurance Supply Chain Communication Finance Performance	Governance Laws and regulation Contractual rights Social	Safety Health Environmental Quality

9.4 Summary of risks after implemented controls and residual risk rating

The Executive Management Committee (EXCO) and the Board assessed Mintek's top risks at the annual strategic planning session held in November 2022. There is continuous risk review, monitoring and reporting throughout the year. The environment in which Mintek does business is inherently risky; thus, the current profile is a reflective picture.





10

Financial Performance

General Information	82
Chief Financial Officer's Report	83
Board's Responsibilities and Approval	84
Audit and Risk Committee Report	85
Report of the Auditor-General	90
Statement of Financial Position	96
Statement of Financial Performance	97
Statement of Changes in Net Assets	98
Cash Flow Statement	99
Statement of Comparison of Budget and Actual Amounts	100
Accounting Policies to the Annual Financial Statements	102
Notes to the Annual Financial Statements	116
Mindev (Pty) Ltd Annual Financial Statements	165



10.1 | General Information

Controlling Entity	Department of Mineral Resources and Energy
Financial Statements relate to	MINTEK Group and Mintek
Domicile, Legal Form and Jurisdiction	Mintek is a research institution, constituted in terms of the Mineral Technology Act No. 30 of 1989, and operates from a Central Office situated in Randburg, South Africa.
Nature of Business and Principal Activities	Mintek's mandate is to serve the national interest through research, development and technology transfer, to promote mineral technology and to foster the establishment and expansion of industries in the field of minerals and products derived therefrom.
Board Members	<p>Non-executive Board Members</p> <p>Dr T Ramontja (Appointed 30 August 2022)</p> <p>Ms NP Zikalala-Mvelase</p> <p>Ms NF Ngcwabe</p> <p>Dr MW Ngobeni</p> <p>Mr R Heydenrich</p> <p>Ms P Maruping</p> <p>Mr H Motaung</p> <p>Ms MM Phiri</p> <p>Mr LL Makibinyane</p> <p>Prof L Ngubevana (Appointed 30 August 2022)</p> <p>Mr RA Moatshe (Alternate)</p> <p>Executive Board Member</p> <p>Dr M Motuku</p>
Chief Executive Officer (CEO)/ President	Dr M Motuku
Chief Financial Officer (CFO)	Mr AS Simelane
Registered office	200 Malibongwe Drive, Randburg, 2125
Business address	200 Malibongwe Drive, Randburg, 2125
Postal address	Private Bag X3015, Randburg, 2125
Bankers	ABSA Bank Limited
Auditors	Auditor General (SA)



Sakhil Simelane
Chief Financial Officer

10.2 | Chief Financial Officer's Report

Mintek's performance for the financial year ending 31 March 2023 underscored the entity's resilience in a testing economic landscape and its capability to successfully navigate a dynamic market environment typified by increasing competition for services and talent. Despite this backdrop, combined with economic volatility and uncertainty, fuelled mainly by the challenges of load shedding and generally harsh economic conditions locally and internationally, Mintek has continued to flourish.

At the core of our success is our unwavering commitment to our people. Recognising our workforce as our most valuable asset, we have invested significantly in attracting and developing a highly skilled and diverse team aligned with our strategic direction, guided by Mintek Strategy 2030. This emphasis on talent has positioned Mintek at the forefront of innovation, enabling us to deliver impactful research outcomes that contribute to advancements in the field.

In support of Mintek Strategy 2030, our bursary programme supported talented individuals in science, engineering and technology, enabling them to pursue postgraduate degrees. The investment in education not only advances knowledge in critical disciplines such as metallurgy, chemical engineering, and geology but also drives the growth of a highly skilled workforce.

Our financial performance saw a 6% increase in revenue, reaching R649 million. This was driven primarily by a 10% rise in Government Grants and Subsidies. Additionally, our commercial income remained robust, contributing 50% of total revenue, reaffirming our competitive edge in the global market.

A significant driver of costs for Mintek has been staff-related expenses. As our workforce is our most valuable asset, and

while we prioritise attracting and retaining top talent aligned with our strategic direction, this commitment to our exceptional workforce naturally leads to increased staff costs. Additionally, adopting a revised organisational structure has resulted in filling previously frozen positions, contributing to the overall increase in employee costs. Despite these cost drivers, we have implemented effective cost management strategies and efficient resource allocation to ensure that staff costs are prudently managed while maintaining a highly skilled and motivated workforce. By striking a balance between investing in our people and exercising financial discipline, we continue to foster a culture of excellence and drive Mintek's long-term success.

Despite the challenges posed by escalating expenditure, Mintek managed to maintain a surplus of R4.9 million. Our financial management decisions, characterised by judicious cost control and resource allocation, aim to ensure long-term financial sustainability.

Mintek's solid financial standing is evident in our robust total assets, which exceeded the milestone of R1 billion. We have improved working capital management, demonstrating our ability to meet short-term obligations whilst ensuring the organisation's stability. Furthermore, our significant cash reserves, exceeding R500 million, validate our sound investment strategies and prudent financial management.

Looking ahead, Mintek remains steadfast in our pursuit of financial sustainability and strategic execution. Our medium-term budget takes a conservative yet forward-thinking approach, considering prevailing economic conditions and our strategic imperatives. We remain dedicated to diversifying our funding sources, forging strategic partnerships, and optimising revenue generation to ensure Mintek's long-term financial stability and continued success.

In conclusion, Mintek is poised to lead transformative advancements in the minerals sector, contributing significantly to South Africa's continued growth and prosperity.

10.3 Statement of Responsibility

The directors are required by the Public Finance Management Act Act 1 of 1999, as amended, to maintain adequate accounting records and are responsible for the content and integrity of the annual financial statements and related financial information included in this report. It is the responsibility of the members to ensure that the annual financial statements fairly present the state of affairs of the entity as at the end of the financial year and the results of its operations and cash flows for the year then ended, in conformity with GRAP. The Auditor-General was engaged to express an independent opinion on the annual financial statements and was given unrestricted access to all financial records, related data and relevant parties.

The financial statements have been prepared in accordance with the Standards of GRAP including any interpretations, guidelines and directives issued by the ASB and in the manner required by the PFMA and Companies Act for the controlled entities.

The annual financial statements are based on appropriate accounting policies consistently applied and supported by reasonable and prudent judgements and estimates.

The directors acknowledges that they are ultimately responsible for the system of internal financial control established by Mintek and place considerable importance on maintaining a strong control environment, which includes the safeguarding of assets and compliance with relevant legislation. To enable the directors to meet these responsibilities, the directors sets standards for internal control aimed at reducing risk of error deficit in a cost effective manner. The standards include the proper delegation of responsibilities within a clearly defined framework, effective accounting and other procedures, and adequate segregation of duties to ensure an acceptable level of risk. These controls are monitored throughout Mintek and all employees and management are required to maintain the highest ethical standards in ensuring the entity's business is conducted in a manner that in all reasonable circumstances is above reproach. The focus of risk management in the economic entity is on identifying, assessing, managing and monitoring all known forms of risk across Mintek. While operating risk cannot be fully eliminated, the economic entity endeavours to minimise it by ensuring that appropriate infrastructure, controls, systems and ethical behaviour are applied and managed within predetermined procedures and constraints.

The board accepts its responsibility to ensure that Mintek is managed in a responsible manner, considering the interest of all stakeholders, including the DMRE, employees, local communities and creditors. Responsible management entails, inter alia, compliance with applicable statutory and regulatory requirements, including risk management.

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 and that the financial statements are free from material misstatement, whether due to fraud or error. However, any system of internal financial control can provide only reasonable, and not absolute, assurance against material misstatement or deficit.

The board has reviewed Mintek's cash flow forecast for the year to 31 March 2024 and, in the light of this review and the current financial position, it is satisfied that Mintek has, or has access to, adequate resources to continue in operational existence for the foreseeable future.

Although the directors are primarily responsible for the financial affairs of the entity, they are supported by the entity's external auditors. The Auditor-General is responsible for independently reviewing and reporting on Mintek's annual financial statements and her report is presented with these financial statements.

The financial statements set out on page 96 to 164, which were prepared on the going concern basis, were approved by the directors on 28 July 2022 and were signed on its behalf by:



Chairperson of the Board
Dr Thibedi Ramontja
28 July 2023



Chief Executive Officer
Dr Molefi Motuku
28 July 2023

10.4 Audit and Risk Committee Report

Report of the Audit and Risk Committee (ARC)

As required by the PFMA, the report of the Audit and Risk Committee (ARC) is prepared in terms of Treasury Regulation 27 and in line with the recommendations of the King IV Report on Corporate Governance for South Africa and its Code of Governance principles. The ARC is a Committee established by the Board to fulfil statutory duties in terms of section 51 (1) (a) (ii), section 76 and section 77 of the PFMA, read together with Treasury Regulation 27 and section 94 (7) of the Companies Act, as well as other duties assigned to it by the Board.

The ARC pays attention to key accounting issues, and audit matters and ensures that proactive risk management is in place that appropriately applies to the environment that MINTEK operates in while playing an essential role in ensuring the integrity and transparency of corporate reporting.

ARC Charter

The ARC adopted a Charter approved by the Board, and the ARC confirms that it has complied with its statutory obligations of the Charter during the financial year under review. The Charter is continuously reviewed in line with changes in legislation, business circumstances, and corporate governance principles. The Charter has been reviewed during the period under review in accordance with King IV's principles and current best practices.

The ARC assists the Board in fulfilling its oversight responsibilities, particularly regarding the evaluation of the adequacy and efficiency of accounting policies, internal controls and financial and corporate reporting processes, risk management and compliance. In addition, the ARC assesses the effectiveness of the internal auditors and the independence and effectiveness of the external auditors. The Chief Executive Officer, Chief Financial Officer, Head of Internal Audit, Group Executives, RDI Operational Services Executive Manager, and representatives of the external auditors attend all meetings by permanent invitation.

Composition and Number of Meetings

The Minister appointed members of the Board for a period of three years, which commenced on 1 June 2020. The Board subsequently appointed the following as Members of the ARC:

Ms Margaret Mosibudi Phiri	Chairperson
Ms Ntombifuthi Phydalis Zikalala Mvelase	Member
Mr Lefadi Lucas Makibinyane	Member
Ms Ntokozo Faith Ngcwabe	Member
Ms Mavis Thomani	Independent Member
Mr Pascalis Mokupo	Independent Member



Audit and Risk Committee Members and Attendance

The ARC held four scheduled meetings and five special meetings during the year under review, and attendance by members was as depicted in the table below:

Committee Members	Total Number of Meetings Attended by Each Member
Ms Margaret Mosibudi Phiri	9/9
Ms Ntombifuthi Phydalis Zikalala Mvelase	9/9
Mr Lefadi Lucas Makibinyane	9/9
Ms Ntokozo Faith Ngcwabe	4/9
Ms Mavis Thomani	9/9
Mr Pascal Mokupo	9/9

Ms Margaret Mosibudi Phiri served as the Chair of the ARC until the end of her term on 31 May 2023. The findings, representations, and content of this report reflect the period under her leadership. Ms Mavis Thomani served as the Independent ARC member during the reporting period and was subsequently appointed as the new Chair of the ARC as of 1 June 2023.

Committee Mandate

The ARC supports the Board in discharging its responsibilities relating to

- Effectiveness and efficiency of operations;
- Compliance with applicable laws, regulations, and supervisory requirements;
- Overseeing and provision of advice on the organisation’s risk management;
- Evaluation of the effectiveness of mitigating strategies implemented to address the material risks of the organisation;
- Supporting Mintek’s business sustainability under normal as well as adverse operating conditions;
- The preparation of accurate financial reporting and statements in compliance with all applicable legal requirements and accounting standards; and
- The operation of adequate systems and control processes.



External Audit

The Auditor-General of South Africa (AGSA) remains the external auditor of Mintek Group in terms of Section 4(3) of the Public Audit Act, No. 25 of 2004.

During the year, the ARC:

- Considered the 2022/23 Draft Group AFS with management and assurance providers for audit and recommended the Draft Group AFS to the Board;
- Concurred that the adoption of the going concern premise in preparation of the financial statements was appropriate;
- Recommended the 2022/23 draft Annual Report to the Board;
- Considered with management the quality and effectiveness of the external audit process, areas of concern and the improvement plans being developed to mitigate identified risks;
- Reviewed significant accounting practices, judgements and estimates adopted by the Company in the application of the Standards of Generally Recognised Accounting Practice and found those to be appropriate; and
- Noted progress reports on the 2022/23 findings as per the Management report.

The Internal Audit Function (IAF)

The Internal Audit Function performs an independent assurance function. The Head: Internal Audit reports functionally to the ARC and administratively to the CEO.

The ARC evaluates the adequacy and effectiveness of internal controls, assesses the effectiveness of the IAF, and approves the Annual Audit Plan.

During the reporting year, the ARC:

- Approved the 2022/23 Internal Audit Plan and rolling three-year plan;
- Reviewed and approved the Internal Audit Charter;
- Considered Internal Audit Quarterly Reports relating to the effectiveness of Mintek’s internal control environment, systems and processes together with the adequacy and appropriateness of related Management’s Corrective Action Plans;
- Considered the effectiveness of the internal audit function;
- Reviewed the internal audit resources to ensure the internal audit is able to discharge its functions.

The CAE resigned during the financial year for 2021/2022, and an interim Acting CAE was appointed while recruiting the new CAE. A service provider was also appointed to assist with the execution of the planned projects. 74% of the projects planned were completed, 13% were in progress, and 13% were deferred to the 2023/24 financial year. The Audit and Risk Committee concluded that the Internal Audit Function was effective due to the successful execution of the audits by in-house internal audit with the assistance of the appointed co-source Internal Audit service provider.

Financial Reporting

The ARC received regular reports from management regarding the performance of Mintek, the tracking and monitoring of key performance indicators, details of budgets, forecasts, capital expenditure, and reliability of management information used during the financial reporting process. The ARC monitored consistency in the application of the accounting and financial policies of Mintek and compliance with accounting standards.

Risk Management

The Board owns the Risk Management Policy of the entity and has delegated the responsibility to the ARC to oversee both risks and opportunities and to ensure that they are appropriately identified, monitored, managed and properly provisioned within Mintek's defined risk appetite. The ARC Charter defines the minimum requirements for the Committee to give effect to its risk oversight responsibilities. The ARC concludes that the system of risk management within Mintek has improved compared to the previous year. The ARC will continue to monitor risk management processes during the 2023/2024 financial year.

Internal Financial Control

During the 2022/23 financial year, the ARC:

- Reviewed the effectiveness of Mintek's system of internal financial control, including receiving assurance from management, internal audit, and external audit; and
- Reviewed significant issues raised by the internal audit and the audit processes.

Discussions were held with external auditors on the results of their audits that an adequate system of internal control is being maintained, however, progress made on implementing some of the preventative or detective controls still required some improvement or actions taken were not sustainable. The ARC has reviewed the findings by the Internal Audit and External audit and concurs with the findings including the emphasis of matters and proposed action plans by management to address the findings. Based on the processes and assurances obtained, the ARC believes the significant internal financial controls are adequate and partially effective.

Other Matters

During the 2022/23 financial year, the ARC:

- Recommended to the Board the reviewed Delegation of Authority; and
- Reviewed proposed changes to the ARC Charter and Annual Work Plan, which sets out its deliverables for the year for recommendation to the Board.

Regulatory Compliance

The ARC complied with all applicable legal and regulatory responsibilities. It is crucial to deliver a sustainable and effective compliant regulatory operating model, which is underpinned by a direct link to the strategic benefits of establishing a winning regulatory environment.

Finance Function

The ARC believes the accounting practices adopted are effective based on the processes and assurance obtained.

Financial Statements

The ARC considered and recommended the Group and Company Annual Financial Statements to the Board for approval based on processes and assurances obtained.

Auditor General's Report

The ARC concurs, accepts the conclusions of the AGSA on the Annual Financial Statements, and believes that the audited Annual Financial Statements must be accepted and read together with the report of the AGSA.

On behalf of the Audit Committee



Ms Mavis Thomani*
Chairperson: ARC

*Please note that Ms Margaret Mosibudi Phiri served as the Chair of the ARC until the end of her term on 31 May 2023. The findings, representations, and content of this report reflect the period under her leadership. As of June 1, 2023, Ms Mavis Thomani was appointed as the new Chair of the ARC and has signed this report in this capacity.



10.5

Report of the Auditor-General to Parliament on the Mintek Group

Report on the audit of the consolidated and separate financial statements

Opinion

- I have audited the consolidated and separate financial statements of the Mintek Group and its subsidiaries (the group) set out on pages 96 to 164, which comprise the consolidated and separate statement of financial position as at 31 March 2023, consolidated and separate statement of financial performance, statement of changes in net assets, cash flow statement and statement of comparison of budget and actual amount with actual information for the year then ended, as well as notes to the consolidated and separate financial statements, including a summary of significant accounting policies.
- In my opinion, the consolidated and separate financial statements present fairly, in all material respects, the financial position of the Mintek Group as at 31 March 2023, and their financial performance and cash flows for the year then ended in accordance with the South African Standards of General Recognised Accounting Practice (GRAP) and the requirements of the Public Finance Management Act of South Africa Act 1 of 1999 (PFMA).

Basis for opinion

- I conducted my audit in accordance with the International Standards on Auditing (ISAs). My responsibilities under those standards are further described in the responsibilities of the auditor-general for the audit of the consolidated and separate financial statements section of my report.
- I am independent of the group in accordance with the International Ethics Standards Board for Accountants' International code of ethics for professional accountants (including International Independence Standards) (IESBA code) as well as other ethical requirements that are relevant to my audit in South Africa. I have fulfilled my other ethical responsibilities in accordance with these requirements and the IESBA code.
- I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Emphasis of matter

- I draw attention to the matter below. My opinion is not modified in respect of this matter.

Restatement of corresponding figures

- As disclosed in note 26 to the financial statements, the corresponding figures for 31 March 2022 were restated as a result of an error in the financial statements of the public entity at, and for the year ended 31 March 2023.

Other matter

- I draw attention to the matter below. My opinion is not modified in respect of this matter.

Unaudited irregular expenditure and fruitless and wasteful expenditure

- On 23 December 2022, the National Treasury issued Instruction Note 4 of 2022-23, which came into effect on 3 January 2023, in terms of section 76(1) (b), (e) and (f), 2(e) and (4)(a) and (c) of the PFMA. The instruction note deals with the PFMA compliance and reporting framework and addresses, amongst others, the disclosure of unauthorised expenditure, irregular expenditure and fruitless and wasteful expenditure. Irregular expenditure and fruitless and wasteful expenditure incurred in prior financial years and not yet addressed no longer need to be disclosed in either the annual report or the disclosure notes to the annual financial statements. Only the current year and prior year figures are disclosed in note 30 to the financial statements of the Mintek Group. Movements in respect of irregular expenditure and fruitless and wasteful expenditure also no longer need to be disclosed in the notes to the annual financial statements. The disclosure of these movements (e.g. condoned, recoverable, removed, written off, under assessment, under determination and under investigation) is now included as part of the other information in the annual report of the Mintek Group. I do not express an opinion on the disclosure of irregular expenditure and fruitless and wasteful expenditure in the annual report.



Responsibilities of the accounting authority for the consolidated and separate financial statements

- The board of directors, which constitutes the accounting authority is responsible for the preparation and fair presentation of the consolidated and separate financial statements in accordance with the GRAP and the requirements of the PFMA; and for such internal control as the accounting authority determines is necessary to enable the preparation of consolidated and separate financial statements that are free from material misstatement, whether due to fraud or error.
- In preparing the consolidated and separate financial statements, the accounting authority is responsible for assessing the group's ability to continue as a going concern; disclosing, as applicable, matters relating to going concern; and using the going concern basis of accounting unless the appropriate governance structure either intends to liquidate the group or to cease operations, or has no realistic alternative but to do so.

Responsibilities of the auditor-general for the audit of the consolidated and separate financial statements

- My objectives are to obtain reasonable assurance about whether the consolidated and separate financial statements as a whole are free from material misstatement, whether due to fraud or error; and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with the ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated and separate financial statements.
- A further description of my responsibilities for the audit of the consolidated and separate financial statements is included in the annexure to this auditor's report.

Report on the audit of the annual performance report

- In accordance with the Public Audit Act 25 of 2004 (PAA) and the general notice issued in terms thereof, I must audit and report on the usefulness and reliability of the reported performance against predetermined objectives for selected strategic objectives presented in the annual performance report. The accounting authority is responsible for the preparation of the annual performance report.
- I selected the following strategic objectives presented in the annual performance report for auditing. I selected objectives that measures the public entity's performance on its primary mandated functions and that are of significant national, community or public interest.

Objectives	Pages numbers	Purpose
Conduct relevant, applied research and technological innovation	48-49	Conducts research and development to create efficient mineral processing innovation technologies and develop value added products and services.
Foster industry establishment and expansion	49	Expansion in the field of minerals and products through research, development and technology transfer.

- I evaluated the reported performance information for the selected strategic objectives against the criteria developed from the performance management and reporting framework, as defined in the general notice. When an annual performance report is prepared using these criteria, it provides useful and reliable information and insights to users on the public entity's planning and delivery on its mandate and objectives.

17. I performed procedures to test whether:
- the indicators used for planning and reporting on performance can be linked directly to the public entity's mandate and the achievement of its planned objectives
 - the indicators are well defined and verifiable to ensure that they are easy to understand and apply consistently and that I can confirm the methods and processes to be used for measuring achievements
 - the targets can be linked directly to the achievement of the indicators and are specific, time bound and measurable to ensure that it is easy to understand what should be delivered and by when, the required level of performance as well as how performance will be evaluated
 - the indicators and targets reported on in the annual performance report are the same as what was committed to in the approved initial or revised planning documents
 - the reported performance information is presented in the annual performance report in the prescribed manner
18. I performed the procedures for the purpose of reporting material findings only; and not to express an assurance opinion.
19. I did not identify any material findings on the reported performance information for the selected subject matters.

Other Matter

20. I draw attention to the matter below.

Achievement of planned targets

21. The annual performance report includes information on reported achievements against planned targets and provides explanations for over and under achievements.

Report on the audit of compliance with legislation

22. In accordance with the PAA and the general notice issued in terms thereof, I must audit and report on compliance with applicable legislation relating to financial matters, financial management and other related matters. The accounting authority is responsible for the public entity's compliance with legislation.
23. I performed procedures to test compliance with selected requirements in key legislation in accordance with the findings engagement methodology of the Auditor-General of South Africa (AGSA). This engagement is not an assurance engagement. Accordingly, I do not express an assurance opinion or conclusion.
24. Through an established AGSA process, I selected requirements in key legislation for compliance testing that are relevant to the financial and performance management of the public entity, clear to allow consistent measurement and evaluation, while also sufficiently detailed and readily available to report in an understandable manner. The selected legislative requirements are included in the annexure to this auditor's report.
25. The material findings on compliance with the selected legislative requirements, presented per compliance theme, are as follows:
26. The financial statements submitted for auditing were not prepared in accordance with the prescribed financial reporting framework, as required by section 55(1) (b) of the PFMA. Material misstatements on revenue and related party identified by the auditors in the submitted financial statements were corrected, resulting in the financial statements receiving an unqualified audit opinion.
27. Effective and appropriate steps were not taken to prevent irregular expenditure as disclosed in note 30 to the annual financial statements, as required by section 51(1) (b) (ii) of the PFMA. The majority of the irregular expenditure was caused by deviations.
28. Effective steps were not taken to prevent fruitless and wasteful expenditure as disclosed in note 30 to the annual financial statements, as required by section 51(1) (b) (ii) of the PFMA. The majority of the fruitless and wasteful expenditure was caused by interest paid.
29. Disciplinary steps were not taken against some of the officials who had incurred irregular expenditure, as required by section 51(1) (e) (iii) of the PFMA.

Annual financial statements

Expenditure management

Consequence management

Other information in the annual report

30. The accounting authority is responsible for the other information included in the annual report, which includes the directors' report, the audit committee's report and the company secretary's certificate, as required by the Companies Act 71 of 2008. The other information referred to does not include the consolidated and separate financial statements, the auditor's report and those selected strategic objectives presented in the annual performance report that have been specifically reported on in this auditor's report.
31. My opinion on the consolidated and separate financial statements, the report on the audit of the annual performance report and the report on compliance with legislation, do not cover the other information included in the annual report and I do not express an audit opinion or any form of assurance conclusion on it.
32. My responsibility is to read this other information and, in doing so, consider whether it is materially inconsistent with the consolidated and separate financial statements and the selected strategic objectives presented in the annual performance report, or my knowledge obtained in the audit, or otherwise appears to be materially misstated.
33. I did not receive the other information prior to the date on this auditor's report. When I do receive and read this information, if I conclude that there is a material misstatement therein, I am required to communicate the matter to those charged with governance and request that the other information be corrected. If the other information is not corrected, I may have to retract this auditor's report and re-issue an amended report as appropriate. However, if it is corrected this will not be necessary.

Internal control deficiencies

34. I considered internal control relevant to my audit of the consolidated and separate financial statements, annual performance report and compliance with applicable legislation; however, my objective was not to express any form of assurance on it.
35. The matters reported below are limited to the significant internal control deficiencies that resulted in the material findings on compliance with legislation.
36. Senior management did not ensure that adequate reviews were performed on compliance with laws and regulations and the submitted financial statements to ensure that they are accurate, complete and compliant with GRAP, which resulted in material amendments to the annual financial statements.

Auditor-General

Johannesburg

31 July 2023



The annexure includes the following:

- the auditor-general's responsibility for the audit
- the selected legislative requirements for compliance testing.

Auditor-general's responsibility for the audit

Professional judgement and professional scepticism

As part of an audit in accordance with the ISAs, I exercise professional judgement and maintain professional scepticism throughout my audit of the consolidated and separate financial statements and the procedures performed on reported

performance information for selected strategic objectives and on the public entity's compliance with selected requirements in key legislation.

Financial statements

In addition to my responsibility for the audit of the consolidated and separate financial statements as described in this auditor's report, I also:

- identify and assess the risks of material misstatement of the consolidated and separate financial statements, whether due to fraud or error; design and perform audit procedures responsive to those risks; and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations or the override of internal control
- obtain an understanding of internal control relevant to the audit 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 group's internal control
- evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made
- conclude on the appropriateness of the use of the going concern basis of accounting in the preparation of the consolidated and separate financial statements. I also conclude, based on the audit evidence obtained, whether a material uncertainty exists relating to events or conditions that may cast significant doubt on the ability of the group and its subsidiaries to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the consolidated and separate financial statements about the material uncertainty or, if such disclosures are inadequate, to modify my opinion on the consolidated and separate financial statements. My conclusions are based on the information available to me at the date of this auditor's report. However, future events or conditions may cause group to cease operating as a going concern
- evaluate the overall presentation, structure and content of the consolidated and separate financial statements, including the disclosures, and determine whether the consolidated and separate financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the group to express an opinion on the consolidated financial statements. I am responsible for the direction, supervision and performance of the group audit. I remain solely responsible for my audit opinion.

Communication with those charged with governance

I communicate with the accounting authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

independence and to communicate with them all relationships and other matters that may reasonably be thought to bear on my independence and, where applicable, actions taken to eliminate threats or safeguards applied.

I also provide the accounting authority with a statement that I have complied with relevant ethical requirements regarding

Compliance with legislation – selected legislative requirements

The selected legislative requirements are as follows:

Legislation	Sections or regulations
Public Finance Management Act 1 of 1999 (PFMA)	PFMA 51(1)(a)(Bi) PFMA 51(1)(e)(iii) PFMA 51(1)(b)(i) PFMA 51(1)(b)(ii) PFMA 52(b) PFMA 54(2)(c) PFMA 54(2)(d) PFMA 55(1)(b) and (a) PFMA 55(1)(c)(i) PFMA 57(b)
Treasury Regulations	TR 31.1.2(c) TR 29.1.1 TR 29.1.1(a) TR 29.1.1(c) TR 29.2.1 TR 29.3.1 TR 33.1.1 TR 33.1.3 National Treasury Instruction Note 3 of 2021/22 par 4.1 and 4.2 National Treasury Instruction Note 4 of 2015/16 par. 3.4 SBD 6.2 issued in 2015/16
Construction Industry Development Board (CIDB) Act	CIDB Act 18(1) CIDB reg. 17; CIDB reg. 25(7A)
Preferential Procurement Regulations of 2022 (PPR)	PPPFA (1) PPPFA 2(1) (a) PPPFA 2(1)(f) 2017 Preferential Procurement reg. 6(8), 7(8), 10(1) &(2)&11(1) 2022 Preferential Procurement regulation 4(4) and 5(4).
Prevention and Combating of Corrupt Activities Act 12 of 2004	PRECCA 34(1)

Statement of Financial Position at 31 March 2023

DESCRIPTION	NOTE	GROUP		CONTROLLING ENTITY	
		2023	2022	2023	2022
		R	R	R	R
ASSETS					
Current Assets		598,293,477	529,270,720	598,293,477	529,270,720
Inventories	1.	21,440,475	16,730,173	21,440,475	16,730,173
Receivables from Exchange Transactions	2.	69,117,371	50,788,559	69,117,371	50,788,559
Cash and Cash Equivalents	3.	507,735,631	461,751,988	507,735,631	461,751,988
Non-Current Assets		411,533,250	438,789,481	411,533,350	438,789,581
Property, Plant and Equipment	4.	408,676,496	435,425,641	408,676,496	435,425,641
Intangible Assets	5.	2,856,754	3,363,840	2,856,754	3,363,840
Non-current Investments	6.	-	-	100	100
Total Assets		1,009,826,727	968,060,201	1,009,826,827	968,060,301
LIABILITIES					
Current Liabilities		347,183,091	309,331,542	347,183,091	309,331,542
Provisions	7.	318,609	705,286	318,609	705,286
Payables from Exchange Transactions	8.	159,639,198	105,269,636	159,639,198	105,269,636
Cash received in advance from Government	9.	186,044,650	201,776,349	186,044,650	201,776,349
Current Portion of Employee Benefit Liabilities	10.	1,180,634	1,580,271	1,180,634	1,580,271
Non-Current Liabilities		5,854,472	6,819,729	45,369,515	46,334,772
Borrowings	18.	-	-	39,515,043	39,515,043
Employee Benefit Liabilities	10.	5,854,472	6,819,729	5,854,472	6,819,729
Total Liabilities		353,037,563	316,151,271	392,552,606	355,666,315
NET ASSETS		656,789,164	651,908,930	617,274,222	612,393,986
Reserves	11.	165,469,214	167,611,742	165,469,214	167,611,742
Accumulated Surplus		491,319,950	484,297,188	451,805,007	444,782,245
Total Net Assets and Liabilities		1,009,826,727	968,060,201	1,009,826,827	968,060,301

Statement of Financial Performance for the year ended 31 March 2023

DESCRIPTION	NOTE	GROUP		CONTROLLING ENTITY	
		2023	2022	2023	2022
		R	R	R	R
REVENUE					
Revenue from Non-exchange Transactions					
Government Grants and Subsidies Received	12.	296,325,981	269,178,509	296,325,981	269,178,509
Interest Earned from Non-Exchange Transactions	15.	888,759	418,066	888,759	418,066
Revenue from Exchange Transactions					
Rendering of Services	13.	323,407,894	321,841,012	323,407,894	321,841,012
Rental of Facilities and Equipment	14.	3,435,564	3,468,635	3,435,564	3,468,635
Interest Earned from Exchange Transactions	15.	21,108,865	13,422,406	21,108,865	13,422,406
Discount Received		42,951	114,950	42,951	114,950
Other Revenue	16.	4,294,634	2,249,644	4,294,634	2,249,644
Total Revenue		649,504,648	610,693,222	649,504,648	610,693,222
EXPENDITURE					
Employee Related Costs	17.	312,063,127	312,874,187	312,063,127	312,874,187
Depreciation and Amortisation	18.	39,244,420	32,264,832	39,244,420	32,264,832
Impairment Losses	19.	1,137,355	4,021,194	1,137,355	4,021,194
Bursary Costs	20.	3,146,433	4,623,825	3,146,433	4,623,825
Finance Costs	21.	919,199	1,636,192	919,199	1,636,192
Professional Services	22.	24,323,986	17,418,717	24,323,986	17,418,717
Rehabilitation Services	23.	95,161,856	75,243,847	95,161,856	75,243,847
General Expenses	24.	165,470,952	142,203,668	165,470,952	142,203,668
Loss on Disposal of Property, Plant and Equipment	4.	1,014,210	2,040,795	1,014,210	2,040,795
Total Expenditure		642,481,537	592,327,256	642,481,537	592,327,256
OPERATING SURPLUS FOR THE YEAR		7,023,111	18,365,966	7,023,111	18,365,966
OTHER REVENUE / EXPENDITURE INCURRED (Losses) / Gains on Other Operations:					
(Losses)/ Gains on Actuarial Valuations	10.	752,174	(700,020)	752,174	(700,020)
(Losses)/ Gains on Foreign Exchange		(2,895,051)	1,971,468	(2,895,051)	1,971,468
TOTAL OTHER REVENUE / EXPENDITURE INCURRED		(2,142,876)	1,271,448	(2,142,876)	1,271,448
SURPLUS FOR THE YEAR		4,880,235	19,637,414	4,880,235	19,637,414

Statement of Changes in Net Assets for the Year Ended 31 March 2023

DESCRIPTION	REVALUATION RESERVE	ACCUMULATED SURPLUS / (DEFICIT)	TOTAL
	R	R	R
Group			
2022			
Balance at 31 March 2021	169,754,268	458,336,373	628,090,641
Correction of Error (note 26)	-	4,180,870	4,180,870
Restated balance at 31 March 2021	169,754,268	462,517,243	632,271,511
Surplus for the year	-	19,637,414	19,637,414
Offsetting of Depreciation	(2,142,527)	2,142,527	-
Balance at 31 March 2022	167,611,741	484,297,184	651,908,925
Surplus for the year	-	4,880,235	4,880,235
Offsetting of Depreciation	(2,142,527)	2,142,527	-
Balance at 31 March 2023	165,469,214	491,319,946	656,789,156
Mintek			
2022			
Balance at 31 March 2021	169,754,268	418,821,430	588,575,698
Correction of Error (Note 26.)	-	4,180,870	4,180,870
Restated Balance	169,754,268	423,002,300	592,756,568
Surplus for the year	-	19,637,414	19,637,414
Offsetting of Depreciation	(2,142,527)	2,142,527	-
Balance at 31 March 2022	167,611,741	444,782,240	612,393,983
Surplus for the year	-	4,880,235	4,880,235
Offsetting of Depreciation	(2,142,527)	2,142,527	-
Balance at 31 March 2023	165,469,214	451,805,002	617,274,214

Details on the movement of the Funds and Reserves are set out in Note 11.
The prior year amount for Accumulated Surplus has been restated. Refer to Note 26.2 on "Correction of Error" for details of the restatement.

Cash Flow Statement for the Year Ended 31 March 2023

DESCRIPTION	NOTE	GROUP		CONTROLLING ENTITY	
		2023	2022	2023	2022
		R	R	R	R
CASH FLOWS FROM OPERATING ACTIVITIES					
Receipts					
Government Grant and Subsidies		282,569,565	274,997,391	282,569,565	274,997,391
Rendering of Services		336,535,528	308,209,922	336,535,528	308,209,922
Interest Received		21,997,624	13,840,472	21,997,624	13,840,472
Other Receipts		5,759,259	5,608,141	5,759,259	5,608,141
Payments					
Employee Related Costs		(323,487,160)	(292,725,022)	(323,487,160)	(292,725,022)
Interest Paid		(753,892)	(1,499)	(753,892)	(1,499)
Suppliers		(94,882,202)	(131,504,076)	(94,882,202)	(131,504,076)
Payments for General Expenses		(168,752,684)	(141,409,269)	(168,752,684)	(141,409,269)
NET CASH FLOWS FROM OPERATING ACTIVITIES	28.	58,986,037	37,016,060	58,986,037	37,016,060
CASH FLOWS FROM INVESTING ACTIVITIES					
Purchase of Property, Plant and Equipment	4.	(13,002,395)	(20,684,756)	(13,002,395)	(20,684,756)
Purchase of Intangible Assets	5.	-	(758,506)	-	(758,506)
NET CASH FLOWS FROM INVESTING ACTIVITIES		(13,002,396)	(21,443,261)	(13,002,396)	(21,443,261)
NET INCREASE / (DECREASE) IN CASH AND CASH EQUIVALENTS		45,983,644	15,572,794	45,983,644	15,572,794
Cash and Cash Equivalents at Beginning of Period	3.	461,751,988	446,179,194	461,751,988	446,179,194
Cash and Cash Equivalents at End of Period:					
- Realised Cash and Cash Equivalents		506,520,711	463,389,473	506,520,711	463,389,473
- Unrealised Foreign Exchange Gains / (Losses)		1,214,920	(1,637,486)	1,214,920	(1,637,486)
Cash and Cash Equivalents at End of Period	3.	507,735,631	461,751,988	507,735,631	461,751,988

DESCRIPTION	ORIGINAL TOTAL BUDGET	ACTUAL	VARIANCE	% VARIANCE OF FINAL BUDGET
	R	R	R	%
FINANCIAL PERFORMANCE				
Revenue from Non-exchange Transactions				
Government Grants and Subsidies Received	282,569,565	296,325,981	13,756,416	4.87%
Interest Earned from Non-Exchange Transactions	-	888,759	888,759	
Revenue from Exchange Transactions				
Rendering of Services	290,091,907	323,407,894	33,315,987	11.48%
Rental of Facilities and Equipment	2,689,000	3,435,564	746,564	27.76%
Interest Earned	13,162,000	21,108,865	7,946,865	60.38%
Discount Received	50,000	42,951	(7,049)	-14.10%
Other Revenue	1,603,000	4,294,634	2,691,634	167.91%
Total Revenue	590,165,472	649,504,648	59,339,176	10.05%
Expenditure				
Employee Related Costs	305,639,361	312,063,127	6,423,766	-2.10%
Depreciation and Amortisation	46,222,904	39,244,420	(6,978,484)	15.10%
Impairment Losses	-	1,137,355	1,137,355	
Finance Costs	1,000,000	919,199	(80,801)	8.08%
Bursary Costs	7,122,992	3,146,433	(3,976,559)	55.83%
Asbestos Rehabilitation	96,525,076	95,161,856	(1,363,220)	1.41%
Professional Services	17,376,064	24,323,986	6,947,922	-39.99%
General Expenses	114,142,075	165,470,952	51,329,138	-44.97%
Loss on Disposal of Property, Plant and Equipment	-	1,014,210	1,014,210	
Total Expenditure	588,028,472	642,481,537	54,453,326	-9.26%
Operating Surplus for the Year	2,137,000	7,023,111	4,885,850	328.60
Losses / (Gains) on Actuarial Valuations	(198,000)	752,174	950,174	479.89%
Losses / (Gains) on Foreign Exchange	500,000	(2,895,051)	(3,395,051)	679.01%
Surplus for the Year	2,439,000	4,880,235	2,440,974	100.08%

Reasons for Variances greater than 10% between Approved Budget and Actual Amount on the various items disclosed in the Statement of Financial Performance are explained below:

Interest Earned from Non-exchange Transactions:	The interest earned from non-exchange transactions are not budgeted for.
Rendering of Services:	Mintek continued its capitalisation on the economic recovery and executed more large scale projects in the current year specifically in the area of leaching.
Rental of Facilities and Equipment:	Additional capacity was rented out during the year that was not anticipated.
Interest Earned:	The repo rate at the time of budget was 3.75%. This was systematically increased by the Monetary Policy committee to 7.25% at the end of the financial year. This resulted in higher interest rates earned.
Discount Received:	Discount received mostly relates to settlement discounts from suppliers where Mintek pay the outstanding accounts within the required timeframe. Due to financial pressures experienced by suppliers, many have cancelled the settlement discount.
Other Revenue:	Other revenue is not budgeted for in full as it relates to sundry income that is received through sources as SDL Levy refund, breach of contract income, insurance recoveries.
Depreciation and Amortisation:	Lower than budget depreciation is as a result of the re-assessment of useful lives adjustment that was processed to write-back depreciation for assets that have an extended useful life and the capitalisation of large capital projects in the previous financial year which started depreciating.
Impairment Losses:	During the year under review Mintek considered outstanding receivables where there are indications that the balances are not recoverable. Provisions for impairments were recognised on those receivables.
Bursary Costs:	Lower than anticipated bursary costs were incurred due to lower number of students and the impact of the temporary suspension of the bursary support program for support staff.
General Expenses:	Higher general expenditure relates mainly to increased consumable cost which was incurred to execute commercial projects. The increase can also be attributed to the higher than anticipated inflationary increases of general goods.
Professional Services:	Professional consultancy services incurred were higher than anticipated as these were driven by increased economic activity. The increased expenditure contributed to the execution of projects which ultimately lead to increased revenue from the rendering of services.
Loss on Disposal of Property, Plant and Equipment:	Several assets were retired during the year under review. Mintek does not budget for write-offs.
Losses on Actuarial Gains:	This relates to the actuarial loss for the PRMA and is not budgeted for as it cannot be estimated upfront.
Losses on Foreign Exchange:	This relates to the foreign exchange differences incurred on foreign exchange denominated transactions recorded during the year. A net loss was recorded as the ZAR currency was quite volatile during the financial year and depreciated during the year from R14.58 to R17.81.

1. BASIS OF PRESENTATION

The Annual Financial Statements have been prepared in accordance with Standards of Generally Recognised Accounting Practices (GRAP), as approved by the Minister of Finance, including any interpretations, guidelines and directives issued by the Accounting Standards Board applicable to Public Entities in terms of Directive 5.

The Annual Financial Statements have been prepared on the accrual basis and in accordance with the historical cost convention as the basis of measurement, unless specified otherwise.

The Statement of Financial Performance has been prepared to classify expenses by nature, whilst revenue is classified in a manner appropriate to Mintek's operations. The Cash Flow Statement has been prepared using the Direct Method.

In the absence of an approved and effective standard of GRAP, accounting policies for material transactions, events or conditions were developed in accordance with paragraphs 8, 10 and 11 of GRAP 3 as read with Directive 5.

The financials are representative to the Group and company and the results are reflective of this. The information contained within the notes are representative of Group and company except where indicated as such.

A summary of the significant accounting policies, which have been consistently applied in the preparation of these annual financial statements, are disclosed below. These accounting policies are consistent with the previous period.

1.1 Presentation Currency

The Annual Financial Statements are presented in South African Rand, rounded off to the nearest Rand which is the Entity's functional currency.

1.2 Changes in Accounting Policy and Comparability

Accounting Policies have been consistently applied, except where otherwise indicated below.

For the years ended 31 March 2022 and 31 March 2023 the Entity has adopted the accounting framework as set out in paragraph 1 above. The details of any resulting changes in comparative restatements are set out below and in Note 26. to the Annual Financial Statements.

1.3 Critical Judgements, Estimations and Assumptions

In the application of the Entity's Accounting Policies, which are described below, management is required to make judgements, estimates and assumptions about the carrying amounts of assets and liabilities that are not readily apparent from other sources. The estimates and associated assumptions are based on historical experience and other factors that are considered to be reasonable under the circumstances, the results of which form the basis of making the judgements about carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates.

These estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period or in the period of the revision and future periods if the revision affects both current and future periods.

The following are the critical judgements and estimations that management have made in the process of applying the Entity's Accounting Policies and that have the most significant effect on the amounts recognised in Annual Financial Statements:

1.3.1 Impairment of Financial Assets

Accounting Policy 3.4 on Impairment of Financial Assets describes the process followed to determine the value at which Financial Assets should be impaired. In making the estimation of the impairment, the management of Mintek considered the detailed criteria of impairment of Financial Assets as set out in GRAP 104 (Financial Instruments) and used its judgement to identify assets that are not in use and make assumptions about possible future usage that are mainly based on market conditions existing at the end of the reporting period. The management of the Entity is satisfied that impairment of Financial Assets recorded during the year is appropriate.

- **Impairment of Trade Receivables:**

The Entity assesses its financial assets for impairment at the end of each financial year. In determining whether an impairment loss should be recorded in surplus or deficit, the Entity makes judgements as to whether there is observable data indicating a measurable decrease in the estimated future cash flows from a financial asset.

The Entity has implemented a policy to classify all debts as irrecoverable where they have been outstanding for more than two years (24 months) for staff debtors or where indicators for irrecoverability exist for commercial

debtors. These amounts are then transferred to a provision for doubtful debts which is adjusted annually. All non recoveries of these amounts impaired are then recognised as bad debts written off in the following year through the statement of financial performance. This practice of 24 months consideration for Staff debtors is based on the past patterns of history of payments by students/default employees after considering the period the debt has been outstanding for. Attempts at recovery of all debt include sending letters of demand and handing debts over to collection agencies as guided in the financial policy of Mintek.

1.3.2. Fair Value Estimations

As described in Accounting Policy 5.2, the Entity subsequently measures its Buildings and Land in terms of the Revaluation Model.

The valuation of assets are based on management's estimation. Management considered the impact of valuation techniques and market information in order to determine the current valuations, and more specific as follows:

- **Buildings and Land** are stated at revalued amounts based on valuation techniques and market information. The actual value of these items could differ from those estimated.

1.3.3 Useful lives of Property, Plant and Equipment and Intangible Assets

As described in Accounting Policies 7. and 6.2, Mintek depreciates its Property, Plant & Equipment and amortises its Intangible Assets over the estimated useful lives of the assets, taking into account the residual values of the assets at the end of their useful lives, which is determined when the assets are available for use.

The estimation of residual values of assets is based on management's judgement as to whether the assets will be sold or used to the end of their useful lives, and in what condition they will be at that time.

1.3.4 Impairment: Write-down of Property, Plant & Equipment, Intangible Assets and Inventories

Property, Plant & Equipment and Intangible Assets

Accounting Policy 7. on Impairment of Assets, Accounting Policy 6.2 on Intangible Assets- Subsequent Measurement, Amortisation and Impairment describe the conditions under which non-financial assets are tested for potential impairment losses by the management of the Entity. Significant estimates and

judgements are made relating to impairment testing of Property, Plant and Equipment and impairment testing of Intangible Assets with regards to recoverable amounts.

In making the above-mentioned estimates and judgement, management considered the subsequent measurement criteria and indicators of potential impairment losses as set out in GRAP 21 (Impairment of Non-cash Generating Assets) and GRAP 26 (Impairment of Cash Generating Assets). In particular, the calculation of the recoverable service amount for PPE and Intangible Assets involves significant judgment by management.

Inventories

Accounting Policy 2.2 on Inventory – Subsequent Measurement describe the conditions under which non-financial assets are tested for recoverability by the management of the Entity. Significant estimates and judgements are made relating to write-down of Inventories to the lowest of Cost and Net Realisable Value.

In making the above-mentioned estimates and judgement, management considered the subsequent measurement criteria and indicators of potential impairment losses as set out in GRAP 21 (Impairment of Non-cash Generating Assets) and GRAP 26 (Impairment of Cash Generating Assets). In particular, the calculation of the Current Replacement Cost for Inventories involves significant judgment by management.

Estimated impairments during the year to Property, Plant and Equipment, Intangible Assets and Inventory are disclosed in Notes 1., 4. and 5. to the Annual Financial Statements, if applicable.

1.3.5 Defined Benefit Plan Liabilities

As described in Accounting Policy 12.2, Employee Benefits - Post-employment Benefits, the Entity obtains actuarial valuations of its Defined Benefit Plan Liabilities. The defined benefit obligations of the Entity that were identified are Post-retirement Health Benefit Obligations. The estimated liabilities are recorded in accordance with the requirements of GRAP 25. Details of the liabilities and the key assumptions made by the actuaries in estimating the liabilities are provided in Note 10. to the Annual Financial Statements.

1.3.6 Provisions and Contingent Liabilities

Management judgement is required when recognising and measuring Provisions and when measuring Contingent Liabilities. Provisions are not discounted due to the short time period that they are active.

1.4 Materiality

Material omissions or misstatements of items are material if they could, individually or collectively, influence the decisions or assessments of users made on the basis of the financial statements. Materiality depends on the nature or size of the omission or misstatement judged in the surrounding circumstances. The nature or size of the information item, or a combination of both, could be the determining factor.

Assessing whether an omission or misstatement could influence decisions of users, and so be material, requires consideration of the characteristics of those users. The Framework for the Preparation and Presentation of Financial Statements states that users are assumed to have a reasonable knowledge of government, its activities, accounting and a willingness to study the information with reasonable diligence. Therefore, the assessment takes into account how users with such attributes could reasonably be expected to be influenced in making and evaluating decisions.

1.5 Consolidation

Consolidated Annual Financial Statements are the annual financial statements of Mintek presented as those of a single entity.

The Consolidated Annual Financial Statements incorporate the annual financial statements of the Mintek Group and all controlled entities, including special purpose entities, which are controlled by Mintek.

Consolidated Annual Financial Statements are prepared using uniform accounting policies for like transactions and other events in similar circumstances.

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

The Annual Financial Statements of Mintek and its subsidiary used in the preparation of the Consolidated Annual Financial Statements are prepared as of the same date.

All intra-entity transactions, balances, revenues and expenses are eliminated in full on consolidation. Non-controlling interest in the net assets of the economic entity are identified and recognised separately from the controlling entity's interest therein, and are recognised within net assets.

Changes in Mintek's ownership interest in Mindev that do not result in a loss of control are accounted for as transactions that affect net assets.

1.6 Going Concern Assumption

Management and the Board have made the assessment that Mintek is a going concern and the financial statements have been prepared on a going concern basis based on the expectation that the entity will continue to operate as a going concern for at least 12 months. Management considered the current business environment and the company's expected performance.

1.7 Standards, Amendments to Standards and Interpretations issued but not yet Effective

There are no new Standards, Interpretations, Directives, or Guidelines, approved not yet effective at 31 March 2023 which are applicable to the Entity.

2. INVENTORIES

2.1 Initial Recognition and Initial Measurement

Inventories comprise current assets held-for-sale, current assets for consumption or distribution during the ordinary course of business. Inventories are initially recognised at cost. Cost generally refers to the purchase price, cost of conversion, transport costs and any other costs in bringing the Inventories to their current location and condition. Where Inventory is manufactured, constructed or produced, the cost includes the cost of labour, materials and overheads used during the manufacturing process.

Where Inventory is acquired by Mintek for no or nominal consideration (i.e. a non-exchange transaction), the cost is deemed to be equal to the fair value of the item on the date acquired.

2.2 Subsequent Measurement

Subsequently inventories are measured at the lower of cost and net realisable value.

2.2.1 Consumable Stores and Finished Goods

Inventories sold are valued at the lower of cost and net realisable value (net amount that the Entity expects to realise from the sale on Inventory in the ordinary course of business). The cost is determined using the Weighted Average Method.

Consumable stores items is distributed at cost and finished goods are valued at the lower of cost and current replacement cost (the cost the Entity would incur to acquire the asset on the reporting date). The cost is determined using the Weighted Average Method.

2.2.2 Other Arrangements

Redundant stock is classified as stock that has no future use. Slow-moving Inventories relates to inventory that has not moved in 12 months. These items are identified through stock reports and are measured at lower of cost or net realisable value. If no future use or consumption can be identified the assets are written off.

Differences arising on the measurement of such Inventory at the lower of cost and current replacement cost or net realisable value, are recognised in Surplus or Deficit in the year in which they arise. The amount of any reversal of any write-down of Inventories arising from an increase in current replacement cost or net realisable value is recognised as a reduction in the amount of Inventories recognised as an expense in the period in which the reversal occurs.

The carrying amount of Inventories is recognised as an expense in the period that the Inventory was sold, distributed, written off or consumed, unless that cost qualifies for capitalisation to the cost of another asset in instances such as capital work-in-progress.

3. FINANCIAL INSTRUMENTS

Mintek has various types of Financial Instruments and these can be broadly categorised as Financial Assets, Financial Liabilities or Residual Interests in accordance with the substance of the contractual agreement.

Initial Recognition

Financial Assets and Financial Liabilities are recognised when it becomes party to the contractual provisions of the instrument.

The Entity does not offset a Financial Asset and a Financial Liability unless a legally enforceable right to set off the recognised amounts currently exist and the Entity intends either to settle on a net basis, or to realise the asset and settle the liability simultaneously.

Fair Value Methods and Assumptions

The fair values of Financial Instruments are determined as follows:

- The fair values of quoted investments are based on current bid prices.
- If the market for a Financial Asset is not active (and for unlisted securities), the Entity establishes fair value by using valuation techniques. These include the use of recent arm's length transactions, reference to other instruments that are substantially the same, discounted cash flow analysis, and option pricing models making maximum use of market inputs and relying as little as possible on Entity-specific inputs.

3.1 Financial Assets – Classification

The Entity has the following types of Financial Assets:

TYPE OF FINANCIAL ASSET	CLASSIFICATION IN TERMS OF GRAP 104
Non-current Investments	Financial Assets at Cost
Receivables from Exchange Transactions	Financial Assets at Amortised Cost
Bank, Cash and Cash Equivalents - Current Investments	Financial Assets at Amortised Cost
Bank, Cash and Cash Equivalents - Bank	Financial Assets at Amortised Cost
Bank, Cash and Cash Equivalents - Cash	Financial Assets at Amortised Cost

Trade and Other Receivables exclude Value Added Taxation.

Cash includes cash-on-hand (including petty cash) and cash with banks (including call and fixed deposits). For the purposes of the Cash Flow Statement, Cash and Cash Equivalents comprise cash-on-hand and deposits held on call with banks, net of bankoverdrafts.

3.2 Financial Liabilities – Classification

The Entity has the following types of Financial Liabilities:

TYPE OF FINANCIAL LIABILITIES	CLASSIFICATION IN TERMS OF GRAP 104
Long-term Liabilities	Financial Liabilities at Amortised Cost
Payables from Exchange Transactions	Financial Liabilities at Amortised Cost
Cash received in advance from Government Entities	Financial Liabilities at Amortised Cost
Current Portion of Long-term Liabilities	Financial Liabilities at Amortised Cost

3.3 Initial and Subsequent Measurement

3.3.1 Financial Assets:

Financial Assets measured at Amortised Cost

Financial Assets at Amortised Cost are initially measured at fair value plus transaction costs that are directly attributable to the acquisition or issue of the Financial Asset. Subsequently, these assets are measured at amortised cost using the Effective Interest Method less any impairment, with interest recognised on an Effective Yield Basis.

3.3.2 Financial Liabilities:

Financial Liabilities held at Amortised Cost

Any other Financial Liabilities are classified as Other Financial Liabilities (All Payables, Loans and Borrowings are classified as Other Liabilities) and are initially measured at fair value, net of transaction costs. Trade and other Payables and Non-interest-bearing Debt are subsequently measured at amortised cost using the Effective Interest Rate Method. Interest expense is recognised in the Statement of Financial Performance by applying the effective interest rate.

3.4 Impairment of Financial Assets

Financial Assets, other than those at fair value, are assessed for indicators of impairment at the end of each reporting period. Financial Assets are impaired where there is objective evidence of impairment of Financial Assets (such as the probability of insolvency or significant financial difficulties of the debtor).

If there is such evidence the recoverable amount is estimated and an impairment loss is recognised through the use of an allowance account.

3.4.1 Financial Assets at Amortised Cost

A provision for impairment of Accounts Receivables is established when there is objective evidence that Mintek will not be able to collect all amounts due according to the original terms of receivables. The provision is made whereby the recoverability of accounts receivable is assessed individually and then collectively after grouping the assets in financial assets with similar credit risk characteristics. The amount of the provision is the difference between the Financial Asset's carrying amount and the present value of estimated future cash flows, discounted at the original effective interest rate. Future cash flows in a group of Financial Assets that are collectively evaluated for impairment are estimated on the basis of historical loss experience for assets with credit risk characteristics similar to those in the

group. Cash flows relating to short-term receivables are not discounted where the effect of discounting is immaterial.

The carrying amount of the Financial Asset is reduced by the impairment loss directly for all Financial Assets carried at Amortised Cost with the exception of Trade Debtors, where the carrying amount is reduced through the use of an allowance account. When a Trade Debtor is considered uncollectible, it is written off against the allowance account. Subsequent recoveries of amounts previously written off are credited against revenue. Changes in the carrying amount of the allowance account are recognised in Surplus or Deficit.

3.4.2 Financial Assets at Cost

If there is objective evidence that an impairment loss has been incurred on an investment in a Residual Interest that is not measured at fair value because its fair value cannot be measured reliably, the amount of the impairment loss is measured as the difference between the carrying amount of the Financial Asset and the present value of estimated future cash flows discounted at the current market rate of return for a similar financial asset. Such impairment losses shall not be reversed.

3.5 Derecognition

3.5.1 Derecognition of Financial Assets

The Entity derecognises Financial Assets only when the contractual rights to the cash flows from the asset expires or it transfers the Financial Asset and substantially all the risks and rewards of ownership of the asset to another entity, except when Mintek approves the write-off of Financial Assets due to non-recoverability.

If Mintek neither transfers nor retains substantially all the risks and rewards of ownership and continues to control the transferred asset, Mintek recognises its retained interest in the asset and an associated liability for amounts it may have to pay. If the Entity retains substantially all the risks and rewards of ownership of a transferred Financial Asset, Mintek continues to recognise the Financial Asset and also recognises a collateralised borrowing for the proceeds received.

3.5.2 Derecognition of Financial Liabilities

Mintek derecognises Financial Liabilities when, and only when, it's obligations are discharged, cancelled or they expire.

Mintek recognises the difference between the carrying amount of the Financial Liability (or part of a Financial Liability) extinguished or transferred to another party

and the consideration paid, including any non-cash assets transferred or liabilities assumed, in Surplus or Deficit.

4. 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 know amount of cash and are subject to an insignificant risk of changes in value. These are initially recognised at cost and subsequently recorded at fair value.

5. PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment are tangible non-current assets (including infrastructure assets) that are held for use in the production and supply of goods and services, rental to others, or for administrative purposes, and are expected to be used during more than one period.

5.1 Initial Recognition and Initial Measurement

Property, Plant and Equipment are initially recognised at cost.

The cost of an item of Property, Plant and Equipment is the purchase price and other cost attributable to bring the asset to the location and condition necessary for it to be capable of operating in the manner intended by management. Trade discounts and rebates are deducted in arriving at the cost. Costs include costs incurred initially to acquire or construct an item of PPE and costs incurred subsequently to add to or replace part or. If a replacement cost is recognised in the carrying amount of an item of PPE, the carrying amount of the replaced part is derecognised.

Where an asset is acquired by the Entity for no or nominal consideration (i.e. a non-exchange transaction), the cost is deemed to be equal to the fair value of that asset on the date acquired.

Repairs and Maintenance are expenses incurred through servicing equipment or repairing of existing assets. These expenses are not recognised in the carrying value of the asset, but directly recognised in Surplus or Deficit and measured at cost.

5.2 Subsequent Measurement

Property, Plant and Equipment, excluding Buildings and Land

Subsequently all Property Plant and Equipment is measured at cost, less accumulated depreciation and accumulated impairment losses.

Buildings and Land

Subsequent to initial recognition Buildings and Land are carried at a revalued amount based on valuations, less any subsequent accumulated depreciation and subsequent accumulated impairment losses. Revaluations are performed by experienced valuers with sufficient regularity (every 5 years) such that the carrying amount does not differ materially from that which would be determined using fair value at the reporting date. Any accumulated depreciation at the date of revaluation is eliminated against the gross carrying amount of the asset, and the net amount is restated to the revalued amount of the asset.

5.3 Depreciation

Depreciation on assets other than land is calculated on cost, using the Straight-line Method, to allocate their cost or revalued amounts to their residual values over the estimated useful lives of the assets. Each part of an item of Property, Plant and Equipment with a cost that is significant in relation to the total cost of the item is depreciated separately.

The depreciation rates are based on the following estimated useful lives:

ASSET CLASS	YEARS	ASSET CLASS	YEARS
LAND		OTHER	
Improved Property	Indefinite	Equipment	5 - 10
		Furniture and Fixtures	5 - 10
BUILDINGS		IT Equipment	3 - 5
Improvements	50	Motor Vehicles	5
		Plant and Machinery	5 - 10

5.4 Land

Land is stated at the revalued amount and is not depreciated as it is deemed to have an indefinite useful life.

5.5 Incomplete Construction Work

Incomplete Construction Work is stated at historical cost. Depreciation only commences when the asset is available for use.

5.6 Derecognition

Items of property, plant or equipment are derecognised when the asset is disposed of or when there are no future economic benefits or service potential expected from the use of the asset. The gain or loss arising from the derecognition of an item of Property, Plant and Equipment is included in surplus or deficit when the item is derecognised. Gains are not classified as revenue.

The gain or loss arising from the derecognition of an item of Property, Plant and Equipment is included in surplus or deficit when the item is derecognised. Gains are not classified as revenue.

6. INTANGIBLE ASSETS

6.1 Initial Recognition and Initial Measurement

Identifiable non-monetary assets without physical substance are classified and recognised as Intangible Assets.

For internally generated Intangible Assets, such as brands, publishing titles, customer lists and other items similar in substance are not recognised as intangible assets. In the Mintek environment only acquired software is classified as intangible assets. Internally created goodwill is also not classified as an intangible asset.

Intangible Assets are initially recognised at cost.

Where an Intangible Asset is acquired by the Entity for no or nominal consideration (i.e. a non-exchange transaction), the cost is deemed to be equal to the fair value of that

asset on the date acquired.

The cost of an Intangible Asset acquired in exchange for non-monetary assets or monetary assets, or a combination of monetary and non-monetary assets, is measured at the fair value of the asset given up, unless the fair value of the asset received is more clearly evident. If the acquired item could not be measured at its fair value, its cost is measured at the carrying amount of the asset given up.

Repairs and Maintenance are expenses incurred through servicing equipment or repairing of existing assets. These expenses are not recognised in the carrying value of the asset, but directly recognised in Surplus or Deficit and measured at cost.

6.2 Subsequent Measurement, Amortisation and Impairment

After initial recognition, Intangible Assets are carried at cost less any accumulated amortisation and any accumulated impairment losses.

Amortisation is charged on a Straight-line Method over the Intangible Assets' useful lives. The residual value of Intangible Assets with finite useful lives is zero, unless an active market exists. Where Intangible Assets are deemed to have indefinite useful lives, such Intangible Assets are not amortised. However, such Intangible Assets are subject to an annual impairment test.

The amortisation rates are based on the following estimated useful lives:

ASSET CLASS	YEARS
Computer Software	3-5

6.3 Derecognition

The gain or loss arising from the derecognition of an item of Intangible Asset is included in Surplus or Deficit when the item is derecognised. Gains are not classified as Revenue.

7. IMPAIRMENT OF ASSETS

Mintek classifies all assets held with the primary objective of generating a commercial return as Cash Generating Assets. All other assets are classified as Non-cash Generating Assets.

7.1 Impairment of Cash Generating Assets

The Entity assesses at each reporting date whether there is any indication that an asset may be impaired.

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 Surplus or Deficit.

An impairment loss is recognised for cash generating units if the recoverable amount of the unit is less than the carrying amount of the unit. The impairment loss is allocated to reduce the carrying amount of the assets of the unit pro rata on the basis of the carrying amount of each asset in the unit.

The Entity 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.

The increased carrying amount of an asset attributable to a reversal of an impairment loss does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset in prior periods.

A reversal of an impairment loss of assets carried at cost less accumulated depreciation or amortisation is recognised immediately in Surplus or Deficit.

7.2 Impairment of Non-cash Generating Assets

The Entity assesses at each reporting date whether there is any indication that an asset may be impaired.

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

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

If the recoverable service amount of an asset is less than its carrying amount, the carrying amount of the asset is reduced to its recoverable service 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 Surplus or Deficit.

An impairment loss is recognised for non-cash generating units if the recoverable service amount of the unit is less than the carrying amount of the unit. The impairment loss is allocated to reduce the carrying amount of the assets of the unit pro rata on the basis of the carrying amount of each asset in the unit.

The Entity 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 service amounts of those assets are estimated.

The increased carrying amount of an asset attributable to a reversal of an impairment loss does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset in prior periods.

A reversal of an impairment loss of assets carried at cost less accumulated depreciation or amortisation is recognised immediately in Surplus or Deficit.

8. INVESTMENT IN CONTROLLED ENTITIES

Investments in controlled entities are consolidated in Mintek annual financial statements. Refer to the accounting policy on Consolidations (Note 1.5).

In Mintek's separate Annual Financial Statements, investments in controlled entities are carried at cost. The entity applies the same accounting for each category of investment.

Investments in controlled entities that are accounted for in accordance with the accounting policy on Financial Instruments in the consolidated annual financial statements, are accounted for in the same way in Mintek's separate annual financial statements.

9. PROVISIONS

9.1 Initial Recognition and Initial Measurement

The best estimate of the expenditure required to settle the present obligation is the amount that the Entity would rationally pay to settle the obligation at the reporting date or to transfer it to a third party at that time and are determined by judgment of Mintek management, supplemented by experience of similar transactions and, in some cases, reports from independent experts. The evidence considered includes any additional evidence provided by events after the reporting date. Uncertainties surrounding the amount to be recognised as a provision are dealt with by various means according to the circumstances. Where the provision being measured involves a large population of items, the obligation is estimated by weighting all possible outcomes by their associated probabilities.

Future events that may affect the amount required to settle an obligation are reflected in the amount of a provision where there is sufficient objective evidence that they will occur. Gains from the expected disposal of assets are not taken into account in measuring a provision. Provisions are not recognised for future operating losses. The present obligation under an onerous contract is recognised and measured as a provision. An onerous contract is a contract in which the unavoidable costs of meeting the obligations under the contract exceed the economic benefits expected to be received under it. The unavoidable costs under a contract reflect the least net cost of exiting from the contract, which is the lower of the cost of fulfilling it and any compensation or penalties arising from failure to fulfil it - this unavoidable cost resulting from the contract is the amount of the provision to be recognised.

9.2 Subsequent Measurement

Provisions are reviewed at reporting date and the amount of a provision is the present value of the expenditure expected to be required to settle the obligation. When the effect of discounting is material, provisions are determined by discounting the expected future cash flows that reflect current market assessments of the time value of money. The impact of the periodic unwinding of the discount is recognised in Surplus or Deficit as a finance cost as it occurs.

The Entity's provisions are made up of warranties. Warranties arise from the Entity recognising its probable liability for meeting its obligation in terms of products and services as stipulated in its contract with customers.

10. LEASES

10.1 The Entity as Lessee

10.1.1 Operating Leases

The Entity recognises operating lease rentals as an expense in the Surplus or Deficit on a Straight-line Basis over the term of the relevant lease. The difference between the amounts recognised as an expense and the contractual payments are recognised as an operating lease asset or liability.

10.2 The Entity as Lessor

Rental revenue from **Operating Leases** is recognised on a Straight-line Basis over the term of the relevant lease.

11. BORROWING COSTS

Borrowing Costs are recognised as an expense in the period in which they are incurred.

12. EMPLOYEE BENEFIT LIABILITIES

12.1 Short-term Employee Benefits

Remuneration to employees is recognised in the Statement of Financial Performance as the services are rendered, except for non-accumulating benefits which are only recognised when the specific event occurs.

Mintek has opted to treat its provision for leave pay as an accrual.

The costs of all short-term employee benefits such as leave pay, are recognised during the period in which the employee renders the related service. The liability for leave pay is based on the total accrued leave days at year-end and is shown as a creditor in the Statement of Financial Position. The Entity recognises the expected cost of performance bonuses only when Mintek has a present legal or constructive obligation to make such payment and a reliable estimate can be made.

12.2 Post-employment Benefits

The Entity provides retirement benefits for its employees, and has a defined benefit post-employment plan.

12.2.1 Defined Contribution Plans

The Entity's contributions to the defined contribution funds are established in terms of the rules governing those plans. Contributions are recognised in Surplus or Deficit in the period in which the service is rendered by the relevant employees. The Entity has no further payment obligations once the contributions have been paid. The contributions are recognised as

employee benefit expense when they are due. Prepaid contributions are recognised as an asset to the extent that a cash refund or a reduction in the future payments is available.

12.2.2 Defined Benefit Plans

Post-retirement Health Care Benefits

The Entity has an obligation to provide Post-retirement Health Care Benefits to certain of its retirees. According to the stipulations of the benefit, qualifying employees are entitled to a medical aid benefit upon retirement.

The defined benefit liability is the aggregate of the present value of the defined benefit obligation and unrecognised actuarial gains and losses, reduced by unrecognised past service costs. The plan is unfunded. The present value of the defined benefit obligation is calculated using the Projected Unit Credit Method, incorporating actuarial assumptions and a discount rate based on the government bond rate. Valuations of these obligations are carried out annually by independent qualified actuaries.

Actuarial gains or losses are recognised immediately in Surplus or Deficit.

Past-service costs are recognised immediately in Surplus or Deficit.

13. NET ASSETS

Included in the Net Assets of the Entity are the following items that are maintained in terms of specific requirements:

13.1 Reserves

13.1.1 Revaluation Reserve

The surplus arising from the revaluation of land and buildings is credited to a non-distributable reserve. The revaluation surplus is realised as revalued buildings are depreciated, through a transfer from the Revaluation Reserve to the Accumulated Surplus/(Deficit). On disposal, the net revaluation surplus is transferred to the Accumulated Surplus/(Deficit) while gains or losses on disposal, based on revalued amounts, are credited or charged to the Statement of Financial Performance.

13.2 Accumulated Funds

Accumulated Funds comprise of rolled over funds from the current and prior years based on the recorded surplus or deficit for the period. The funds are not cash backed.

14. SHARE CAPITAL

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

15. REVENUE RECOGNITION

15.1 General

Revenue is derived from a variety of sources which include state grant, grants from other tiers of government and revenue from trading activities and other services provided.

Revenue comprises the fair value of the consideration received or receivable for the sale of goods and services in the ordinary course of the Entity's activities. Revenue is shown net of value-added tax, returns, rebates and discounts.

15.2 Revenue from Non-exchange Transactions

15.2.1 Government Grants and Subsidies

Conditional grants, donations and funding are recognised as revenue to the extent that Mintek has complied with any of the criteria, conditions or obligations embodied in the agreement.

Government grants that are 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, are recognised in Surplus or Deficit in the period in which they become receivable.

Interest earned on investments is treated in accordance with grant conditions. If it is payable to the funder it is recorded as part of the creditor and if it is the Entity's interest, it is recognised as interest earned in Surplus or Deficit.

Revenue is recognised when all conditions associated with the contribution have been met or where the contribution is to finance property, plant and equipment, when such items of property, plant and equipment are brought into use.

15.2.2 Revenue from Recovery of Irregular, Fruitless and Wasteful Expenditure

The recovery of irregular, fruitless and wasteful expenditure is based on legislated procedures, including those set out in the Public Finance Management Act (Act No 1 of 1999) and is recognised as revenue when the recovery thereof from the responsible officials became virtually certain in a financial period subsequent to the period when the actual unauthorised, irregular, fruitless and wasteful expenditure was incurred.

15.3 Revenue from Exchange Transactions

15.3.1 Sale of Goods

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

- The Entity has transferred to the buyer the significant risks and rewards of ownership of the goods;
- The Entity 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 or service potential associated with the transaction will flow to the Entity; and
- The costs incurred or to be incurred in respect of the transaction can be measured reliably.

Revenue received from the sale of Products and Services is generated during the ordinary course of business from commercial customers. This includes the sale of finished goods to local and international clients and the provision of scientific or engineering services as required.

15.3.2 Services Rendered

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 reporting date. The outcome of a transaction can be estimated reliably when the following conditions are satisfied:

- The amount of revenue can be measured reliably;
- It is probable that the economic benefits or service potential associated with the transaction will flow to Mintek;
- The stage of completion of the transaction at reporting date can be measured reliably; and
- The costs incurred for the transaction and the costs to complete the transaction can be measured reliably.

Revenue is generated on a project basis and is recognised based on the percentage of completion as outlined in project agreements for the rendering of services.

Contract Research revenue is received for projects funded mainly by the Department of Science and Innovation (DSI). Research proposals are submitted

for consideration and funding is received for approved research projects.

Revenue received from the sale of Products and Services is generated during the ordinary course of business from commercial customers. This includes the sale of finished goods to local and international clients and the provision of scientific or engineering services as required.

Contract Revenue - Rehabilitation relates to the revenue generated on the Asbestos Rehabilitation projects where the revenue is calculated based on the percentage completion. The funding for these projects is made available by the Department of Mineral Resources and Energy (DMRE).

Contract Revenue - Other is revenue recognised for work performed where the Entity is the programme coordinator. Revenue is therefore agreed upon on a project-by-project basis for the services performed.

When services are performed by an indeterminate number of acts over a specified time frame, revenue is recognised on a straight-line basis over the specified time frame unless there is evidence that some other method better represents the stage of completion. When a specific act is much more significant than any other acts, the recognition of revenue is postponed until the significant act is executed.

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

15.3.3 Interest, Rental Income and Other Income Items

Revenue arising from the use by others of entity assets yielding interest, royalties, rental income and other income is recognised when:

- it is probable that the economic benefits or service potential associated with the transaction will flow to Mintek; and
- The amount of the revenue can be measured reliably.

Interest earned on investments is recognised in Surplus or Deficit on the Time-proportionate Basis that takes into account the effective yield on the investment.

Rental income is recognised on a Straight-line Basis over the term of the lease agreement.

Other income refers to income generated during the normal course of business, which does not fall into any

of the classes of revenue from exchange transactions. This is recognised based on the revenue recognition principles as set out above.

16. TREATMENT OF ADMINISTRATION AND OTHER OVERHEAD EXPENSES

The costs of internal support services are transferred to the various services and departments to whom resources are made available. This is distribution is based on several statistical keys such as head count and usage.

17. FOREIGN CURRENCIES

Transactions in foreign currencies are translated to the functional currency of Mintek at exchange rates at the dates of the transactions.

Monetary assets and liabilities denominated in foreign currencies at the reporting date are retranslated to the functional currency at the exchange rate at that date. The foreign currency gain or loss on monetary items is the difference between amortised cost and fair value in the functional currency at the beginning of the period, adjusted for effective interest and payments during the period, and the amortised cost in foreign currency translated at the exchange rate at the end of the reporting period.

Non-monetary assets and liabilities denominated in foreign currencies that are measured at fair value are retranslated to the functional currency at the exchange rate at the date that the fair value was determined. Foreign currency differences arising on retranslation are recognised in the Statement of Financial Performance.

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.

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

18. CHANGES IN ACCOUNTING POLICIES, ESTIMATES AND ERRORS

In such cases the Entity shall restate the opening balances of assets, liabilities and net assets for the earliest period for which retrospective restatement is practicable.

Changes in accounting estimates are applied prospectively in accordance with GRAP 3 requirements. Details of changes in estimates are disclosed in Note 27. to the Annual Financial Statements where applicable.

Correction of errors is applied retrospectively in the period in which the error has occurred in accordance with GRAP 3 requirements, except to the extent that it is impracticable to determine the period-specific effects or the cumulative effect of the error. In such cases Mintek shall restate the opening balances of assets, liabilities and net assets for the earliest period for which retrospective restatement is practical.

Details of Correction of Errors are disclosed in Note 26. to the Annual Financial Statements.

19. UNAUTHORISED EXPENDITURE

Unauthorised Expenditure is expenditure that has not been budgeted for, expenditure that is not in terms of the conditions of an allocation received from another sphere of government and expenditure in the form of a grant that is not permitted in terms of the Public Finance Management Act (Act No 1 of 1999).

All expenditure relating to Unauthorised Expenditure is accounted for as an expense in Surplus or Deficit in the year that the expenditure was incurred. The expenditure is classified in accordance with the nature of the expense, and where recovered, it is subsequently accounted for as revenue in Surplus or Deficit.

20. IRREGULAR EXPENDITURE

Irregular Expenditure is expenditure that is contrary to the Public Finance Management Act (Act No 1 of 1999), or is in contravention of the Entities' Supply Chain Management Policies. Irregular Expenditure excludes Unauthorised Expenditure.

Irregular Expenditure is accounted for as an expense in Surplus or Deficit in the period it occurred and where recovered, it is subsequently accounted for as revenue in Surplus or Deficit.

21. FRUITLESS AND WASTEFUL EXPENDITURE

Fruitless and Wasteful Expenditure is expenditure that was made in vain and would have been avoided had reasonable care been exercised.

All expenditure relating to Fruitless and wasteful expenditure is accounted for as expenditure in Surplus or Deficit in the year that the expenditure was incurred. The expenditure is classified in accordance with the nature of the expense, and where recovered, it is subsequently accounted for as revenue in Surplus or Deficit.

22. COMMITMENTS

Commitments are future expenditure to which the Entity committed and that will result in the outflow of resources. Commitments are not recognised in the Statement of Financial Position as a liability or as expenditure in Surplus or Deficit, but are included in the disclosure Notes. A distinction is made between capital and current commitments.

23. RELATED PARTIES

Individuals as well as their close family members, and/or entities are related parties if one party has the ability, directly or indirectly, to control or jointly control the other party or exercise significant influence over the other party in making financial and/or operating decisions. Management is regarded as a related party and comprises the Board Members, Chairman, Group Executive Members, Chief Executive Officer, Chief Financial Officer and all other managers reporting directly to the Chief Executive Officer or as designated by the Chief Executive Officer if they are deemed to have significant influence.

Only transactions with related parties not at arm's length or not in the ordinary course of business are disclosed. Mintek does however disclose certain transactions which occurred during the financial year for information purposes.

24. CONTINGENT ASSETS AND CONTINGENT LIABILITIES

Contingent Assets and Contingent Liabilities are not recognised. Contingencies are disclosed in Notes to the Annual Financial Statements.

25. TAXATION

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.

25.1 Income Tax

The Entity is exempted from paying Income Tax in terms of section 10(1) cA(i) of the Income Tax Act, No 58 of 1962. Mindev and PhilisaSechaba is registered for Income Tax. The subsidiaries' liability for current tax is calculated using tax rates that have been enacted or substantively enacted by the end of the reporting period.

25.2 Value Added Tax

The Entity accounts for Value Added Tax on the Invoice Basis in accordance with section 15(2)(a) of the Value-Added Tax Act (Act No 89 of 1991).

26. EVENTS AFTER THE REPORTING DATE

Events after the reporting date are those events, both favourable and unfavourable, that occur between the reporting date and the date when the financial statements are authorised for issue.

Adjusting events are those that provide evidence of conditions that existed at the reporting date. Events after the reporting date that are classified as adjusting events have been accounted for in the Annual Financial Statements.

Non-adjusting events are those that are indicative of conditions that arose after the reporting date. The events after the reporting date that are classified as Non-adjusting Events after the Reporting Date have been disclosed in Notes to the Annual Financial Statements.

27. COMPARATIVE INFORMATION

When the presentation or classification of items in the Annual Financial Statements is amended, prior period comparative amounts are reclassified. The nature and reason for the reclassification is disclosed.

28. SEGMENT REPORTING

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

In order to properly execute its mandate and achieve its strategic goals, internal management reporting is produced and reviewed per cluster in order to make decisions on the allocation of resources and to assess performance, and these have therefore been identified as its reportable segments for reporting in terms of GRAP 18.

The following components have been identified as individually significant segments for purposes of reporting in terms of GRAP 18 (Segment Reporting):

- The provision of research services in extractive metallurgy disciplines
- The provision of research in mineral processing and characterisation
- The provision of research services in mining, materials and process automation

These clusters are categorised based on the fact that they have similar economic characteristics and share a majority of the aggregation criteria such as, nature of the goods and/or services delivered, the type or class of customer to which goods and/or services are delivered and the method used to distribute the goods or provide the services.

Management have assessed the characteristics of its sections and is of the opinion that these sections have similar economic characteristics and have therefore been aggregated in the segmental disclosures, with any other non-project items reported as Support Services.

Mintek only operates in a single geographical location and accordingly does not report separately on each location within its jurisdiction.

The accounting policies for segmental reporting in the management accounts are aligned to the requirements of GRAP as described in these accounting policies.

No changes were made from prior periods measurement methods used to determine reported segment surplus or deficit.

The Segmental Reporting is disclosed in Note 38. to the Annual Financial Statements.

1. INVENTORIES

	2023	2022
	R	R
Consumable Stores	14,016,750	13,354,672
Finished Goods	3,542,910	3,027,475
Work-in-Progress	3,880,815	348,026
Total Inventories	21,440,475	14,627,883

Inventories in the Consumable Stores are held for own use while Finished Goods are sold to potential customers. Inventory is measured at the lower of Cost and Net Realisable Value. No write downs of Inventory to Net Realisable Value were required as there are no indications of impairment for any of the inventory held.

Consumable Stores Include:

Stationery and Paper	920,611	231,134
MAC Raw Materials and Consumables	7,420,848	8,352,001
General Consumables	5,037,594	4,193,448
Workshop Consumables	637,698	578,089
	14,016,750	13,354,672

The cost of Inventories recognised as an expense during the period was R20,823,030 (2022: R23,061,651).

No inventories are expected to be utilised only after more than twelve months.

No Inventories have been pledged as collateral for Liabilities as per Note 8.

2. RECEIVABLES FROM EXCHANGE TRANSACTIONS	GROSS BALANCES	PROVISION FOR IMPAIRMENT	NET BALANCES
As at 31 March 2023	R	R	R
Trade Debtors	22,155,393	144,898	22,010,495
Prepaid Expenses	14,698,133	-	14,698,133
Deposits	275,093	-	275,093
Government Debtors	4,720,260	-	4,720,260
Project Work-in-Progress	24,628,919	-	24,628,919
Staff Debtors	4,010,683	1,226,212	2,784,471
Total Receivables from Exchange Transactions	70,488,480	1,371,109	69,117,371

2. RECEIVABLES FROM EXCHANGE TRANSACTIONS	GROSS BALANCES	PROVISION FOR IMPAIRMENT	NET BALANCES
As at 31 March 2022	R	R	R
Trade Debtors	24,339,779	617,545	23,722,234
Prepaid Expenses	4,517,816	-	4,517,816
Deposits	275,093	-	275,093
Government Debtors	1,808,811	-	1,808,811
Project Work-in-Progress	18,477,100	-	18,477,100
Staff Debtors	2,280,918	293,414	1,987,504
Total Receivables from Exchange Transactions	51,699,517	910,958	50,788,559

2. RECEIVABLES FROM EXCHANGE TRANSACTIONS (Continued)

	2023	2022
	R	R
The Carrying Amount of Trade Receivables are denominated in the following Currencies:		
SA Rand	17,641,019	21,256,336
US Dollar	2,910,450	2,503,917
EUR	372,900	378,495
AUD	1,069,779	201,031
CAD	161,244	-
Total Receivables	22,155,393	24,339,779

Trade Debtors include outstanding debtors for local and international customers where services were rendered or products sold. It also includes debtors where breach of contract occurred.

Prepaid Expenses include transactions where Mintek made payment in advance for goods/services that would only be delivered/ rendered after year-end.

Deposits include funds held at the local municipality for municipal charges deposit.

Government Debtors refers to monies outstanding from government organisations for work performed on specified programmes.

Project Work-in-Progress relates to the recognition of an asset where project work has been performed but no billing has taken place yet.

Staff Debtors include staff advances for travel and amounts owing by employees who are studying full time.

Trade Debtors are billed as per project proposal/purchase order and collected in terms of the standard collection procedures.

The credit risk of all new debtors are assessed considering the nature of the company and the credit required. Some credit applications are referred to an external company for review and their assessment is considered when the decision to grant credit is made. Credit limits are reviewed periodically.

2.1 AGEING OF RECEIVABLES FROM EXCHANGE TRANSACTIONS

As at 31 March 2023

	CURRENT	PAST DUE			TOTAL
	0 - 30 DAYS	31 - 60 DAYS	61 - 90 DAYS	+ 90 DAYS	
Trade Debtors:					-
Gross Balances	18,241,152	1,215,050	(1,235,012)	3,934,203	22,155,393
Less: Provision for Impairment	-	-	-	(144,898)	(144,898)
Net Balances	18,241,152	1,215,050	(1,235,012)	3,789,305	22,010,495
Prepaid Expenses:					
Gross Balances	13,157,576	108,293	48,288	1,383,977	14,698,133
Less: Provision for Impairment	-	-	-	-	-
Net Balances	13,157,576	108,293	48,288	1,383,977	14,698,133
Deposits:					
Gross Balances	275,093	-	-	-	275,093
Less: Provision for Impairment	-	-	-	-	-
Net Balances	275,093	-	-	-	275,093
Government Debtors:					
Gross Balances	4,528,323	-	518	191,420	4,720,260
Less: Provision for Impairment	-	-	-	-	-
Net Balances	4,528,323	-	518	191,420	4,720,260
Project Work-in-Progress:					
Gross Balances	21,043,298	435,000	717,123	2,433,498	24,628,919
Less: Provision for Impairment	-	-	-	-	-
Net Balances	21,043,298	435,000	717,123	2,433,498	24,628,919
Staff Debtors:					
Gross Balances	1,757,056	-	-	2,253,627	4,010,683
Less: Provision for Impairment	-	-	-	(1,226,212)	(1,226,212)
Net Balances	1,757,056	-	-	1,027,415	2,784,471

As at 31 March 2023 Receivables of R10,114,874 were past due but not impaired.
The age analysis of these Receivables are as follows:

All Receivables:					
Gross Balances	59,002,496	1,758,343	(469,083)	10,196,724	70,488,480
Less: Provision for Impairment	-	-	-	(1,371,110)	(1,371,110)
Net Balances	59,002,496	1,758,343	(469,083)	8,825,615	69,117,371

2.1 AGEING OF RECEIVABLES FROM EXCHANGE TRANSACTIONS (Continued)

As at 31 March 2022

	CURRENT	PAST DUE			TOTAL
	0 - 30 DAYS	31 - 60 DAYS	61 - 90 DAYS	+ 90 DAYS	
Trade Debtors:					
Gross Balances	16,425,338	4,109,031	1,797,136	2,008,274	24,339,779
Less: Provision for Impairment	-	-	-	(617,545)	(617,545)
Net Balances	16,425,338	4,109,031	1,797,136	1,390,729	23,722,234
Prepaid Expenses:					
Gross Balances	2,977,258	108,293	48,288	1,383,977	4,517,816
Less: Provision for Impairment	-	-	-	-	-
Net Balances	2,977,258	108,293	48,288	1,383,977	4,517,816
Deposits:					
Gross Balances	275,093	-	-	-	275,093
Less: Provision for Impairment	-	-	-	-	-
Net Balances	275,093	-	-	-	275,093
Government Debtors:					
Gross Balances	127,968	-	-	1,680,843	1,808,811
Less: Provision for Impairment	-	-	-	-	-
Net Balances	127,968	-	-	1,680,843	1,808,811
Project Work-in-Progress:					
Gross Balances	11,352,208	1,223,675	3,414,018	2,487,199	18,477,100
Less: Provision for Impairment	-	-	-	-	-
Net Balances	11,352,208	1,223,675	3,414,018	2,487,199	18,477,100
Staff Debtors:					
Gross Balances	915,446	-	-	1,365,472	2,280,918
Less: Provision for Impairment	-	-	-	(293,414)	(293,414)
Net Balances	915,446	-	-	1,072,059	1,987,504

As at 31 March 2022 Receivables of R18,715,248 were past due but not impaired.
The age analysis of these Receivables are as follows:

All Receivables:					
Gross Balances	32,073,311	5,440,999	5,259,442	8,925,765	51,699,517
Less: Provision for Impairment	-	-	-	(910,958)	(910,958)
Net Balances	32,073,311	5,440,999	5,259,442	8,014,807	50,788,559

2.2 RECONCILIATION OF THE PROVISION FOR IMPAIRMENT

	2023	2022
	R	R
Balance at beginning of year	910,958	1,298,067
Impairment Losses recognised	1,227,780	756,787
Impairment Losses reversed	(90,426)	(3,009)
Amounts written off as uncollectable	(677,203)	(1,140,886)
Balance at end of year	1,371,109	910,958

In determining the recoverability of Receivables, reviews were conducted by the respective divisional managers. Provision for impairment of Receivables has been made for all debtor balances outstanding for more than 120 days where it is unlikely that the outstanding amounts will be recovered.

The impairment recognised represents the difference between the carrying amount of these Receivables and the present value of the expected liquidation proceeds. The Entity does not hold any collateral over these balances.

Trade and Other Receivables which are less than 4 months past due are not considered to be impaired unless there are specific indicators such as business rescue.

2.3 DERECOGNITION OF FINANCIAL ASSETS

No Financial Assets have been transferred to other parties during the year.

3. CASH AND CASH EQUIVALENTS

	2023	2022
	R	R
Current Investments	463,800,035	386,642,860
Bank Accounts	43,905,131	75,087,418
Cash-on-Hand	30,465	21,710
Total Bank, Cash and Cash Equivalents	507,735,631	461,751,988

For the purposes of the Statement of Financial Position and the Cash Flow Statement, Cash and Cash Equivalents include Cash-on-Hand, Cash in Banks and Investments in Money Market Instruments.

Fixed Deposits are investments with a maturity period of less than 12 months, deposited for fixed terms, and earn interest rates varying from 7,250% to 8,00% (2022: 3,850% to 5,60%) per annum.

Deposits of R186,044,650 (2022: R201,776,349) are ring-fenced and attributable to Cash Received in Advance from Government. Interest accrued on funds held is capitalised to the project dependant on the contract terms. These funds were received mainly for research work but also for project management and the scope of work for these funds are as per contractual agreement. The funds are utilised as work is performed. Refer Note 9.

An amount of R5,041,973 (2022: R4,698,413) is held as a cession by Rand Merchant Bank for guarantee facilities. No other Cash and Cash Equivalents are pledged as security for financial liabilities of the Entity. There are currently no Guarantees outstanding.

for the Year Ended on 31 March 2023

for the Year Ended on 31 March 2023

4. PROPERTY, PLANT AND EQUIPMENT									
31 MARCH 2023									
RECONCILIATION OF CARRYING VALUE									
Description	Land	Buildings	Computer Equipment		Furniture and Fittings	Plant, Machinery and Equipment	Motor Vehicles	Catering, Building and Office Equipment	Total
	R	R	R		R	R	R	R	R
Carrying values at 01 April 2022	124,656,851	107,802,801	17,076,159		3,956,918	161,335,129	2,821,228	17,776,556	435,425,641
Cost	124,656,851	156,446,312	34,062,111		9,846,956	384,060,107	6,535,885	31,551,971	747,160,193
- Completed Assets	124,656,851	137,385,163	34,062,111		9,846,956	359,885,536	6,535,885	29,925,703	702,298,205
- Under Construction	-	19,061,149	-		-	24,174,571	-	1,626,268	44,861,988
Accumulated Impairment Losses	-	-	(5,563)		-	(26,538,371)	-	(285,483)	(26,829,417)
Accumulated Depreciation	-	(48,643,511)	(16,980,390)		(5,890,038)	(196,186,607)	(3,714,657)	(13,489,931)	(284,905,135)
Acquisitions	-	-	4,026,362		43,245	7,944,999	-	93,906	12,108,512
Capital under Construction - Additions	-	132,867	-		-	658,565	-	102,451	893,883
Depreciation:	-	(4,451,226)	(4,927,763)		(1,054,960)	(24,819,076)	(681,241)	(3,076,354)	(39,010,620)
- Standard Depreciation	-	(4,451,226)	(6,485,190)		(1,180,324)	(29,851,669)	(822,499)	(3,673,223)	(46,464,131)
- Re-Assessment: Change in Estimate	-	-	1,557,427		125,364	5,032,593	141,258	596,869	7,453,511
Carrying value of Disposals:	-	-	(556,179)		(14,638)	(141,866)	-	(11,967)	(724,650)
- Cost	-	-	(1,348,701)		(56,731)	(557,622)	-	(46,983)	(2,010,038)
- Accumulated Depreciation	-	-	792,522		42,093	415,756	-	35,016	1,285,387
Capital under Construction - Completed	-	(19,066,740)	-		-	(371,370)	-	(1,725,207)	(21,163,317)
Transfers	-	19,061,149	96,598		90,698	1,750,742	-	147,860	21,147,047
Cost	-	19,061,149	410,617		231,007	1,762,841	-	(331,997)	21,133,618
Accumulated Depreciation	-	-	(314,020)		(140,309)	(12,099)	-	479,857	13,430
Carrying values at 31 March 2023	124,656,851	103,478,851	15,715,176		3,021,263	146,357,123	2,139,987	13,307,245	408,676,496
Cost	124,656,851	156,573,588	37,150,390		10,064,477	393,497,520	6,535,885	29,644,140	758,122,851
- Completed Assets	124,656,851	156,446,312	37,150,390		10,064,477	369,035,754	6,535,885	29,640,629	733,530,297
- Under Construction	-	127,276	-		-	24,461,766	-	3,512	24,592,554
Accumulated Impairment Losses	-	-	(5,563)		-	(26,538,371)	-	(285,483)	(26,829,417)
Accumulated Depreciation	-	(53,094,737)	(21,429,651)		(7,043,214)	(220,602,026)	(4,395,898)	(16,051,412)	(322,616,938)

for the Year Ended on 31 March 2023

for the Year Ended on 31 March 2023

4. PROPERTY, PLANT AND EQUIPMENT									
31 MARCH 2022									
RECONCILIATION OF CARRYING VALUE									
Description	Land	Buildings	Computer Equipment		Furniture and Fittings	Plant, Machinery and Equipment	Motor Vehicles	Catering, Building and Office Equipment	Total
	R	R	R		R	R	R	R	R
Carrying values at 01 April 2021	124,656,851	110,960,201	15,665,641		3,707,295	143,749,517	2,274,945	50,112,346	451,126,797
Cost	124,656,851	154,870,709	34,421,403		9,200,630	344,932,156	5,580,899	59,486,711	733,149,358
- Completed Assets	124,656,851	137,385,160	34,421,403		9,200,630	318,418,457	5,580,899	29,846,313	659,509,713
- Under Construction	-	17,485,549	-		-	26,513,699	-	29,640,397	73,639,645
Accumulated Impairment Losses	-	-	(5,563)		-	(23,541,271)	-	(15,167)	(23,562,001)
Accumulated Depreciation	-	(43,910,508)	(18,750,198)		(5,493,335)	(177,641,368)	(3,305,954)	(9,359,197)	(258,460,561)
Acquisitions	-	-	2,798,413		809,724	11,025,857	962,315	436,578	16,032,887
At Cost	-	-	2,798,413		809,724	11,025,857	962,315	436,578	16,032,887
Increase in Valuation	-	-	-		-	-	-	-	-
Capital under Construction - Additions	-	1,575,600	-		-	3,076,269	-	-	4,651,869
Depreciation:	-	(4,733,003)	(711,621)		(411,138)	(20,803,963)	(416,033)	(4,134,021)	(31,209,778)
- Standard Depreciation	-	(4,806,456)	(6,869,305)		(1,069,603)	(34,845,345)	(703,178)	(4,813,399)	(53,107,286)
- Re-Assessment: Change in Estimate	-	73,453	6,157,684		658,465	14,041,383	287,145	679,378	21,897,508
Carrying value of Disposals:	-	-	(676,274)		(319)	(1,082,484)	-	(998)	(1,760,076)
- Cost	-	-	(3,157,703)		(14,754)	(3,341,207)	(7,330)	(4,285)	(6,525,280)
- Accumulated Depreciation	-	-	2,481,429		14,435	2,258,723	7,330	3,286	4,765,204
Impairment Losses	-	-	-		-	(2,997,100)	-	(270,316)	(3,267,416)
Capital under Construction - Completed	-	-	-		-	(5,415,397)	-	(28,014,129)	(33,429,526)
Transfers	-	-	-		(148,644)	33,782,430	-	(352,904)	33,280,882
Carrying values at 31 March 2022	124,656,851	107,802,800	17,076,159		3,956,918	161,335,129	2,821,228	17,776,556	435,425,641
Cost	124,656,851	156,446,311	34,062,111		9,846,956	384,060,107	6,535,885	31,551,971	747,160,193
- Completed Assets	124,656,851	137,385,163	34,062,111		9,846,956	359,885,536	6,535,885	29,925,703	702,298,205
- Under Construction	-	19,061,149	-		-	24,174,571	-	1,626,268	44,861,988
Accumulated Impairment Losses	-	-	(5,563)		-	(26,538,371)	-	(285,483)	(26,829,417)
Accumulated Depreciation	-	(48,643,511)	(16,980,390)		(5,890,038)	(196,186,607)	(3,714,657)	(13,489,931)	(284,905,135)

4. PROPERTY, PLANT AND EQUIPMENT (Continued)				
4.1 Market Value of Properties				
The Market Values as at the previous valuation date of 31 March 2021 of all the properties that the Entity recognises on its Statement of Financial Position are listed below. Land and buildings is revalued every five years and the next valuation is due in 2026.				
City / Property	Address	Title Deed	Land	Buildings
JOHANNESBURG Farm Klipfontein, 203-IQ, Portion 175	200 Malibongwe Drive	T14633/1970	97,525,956	64,911,249
JOHANNESBURG Farm Klipfontein, 203-IQ, Portion 226	200 Malibongwe Drive	T22082/1998	27,130,895	4,947,920
JOHANNESBURG Malanshof Heights, 203-IQ, Erf 560	16 Hans Schoeman Street Sectional title units 15, 28, 29 and 30	T20072/1981	-	1,875,420
			124,656,851	71,734,589

2023	2022
R	R

4.2 Impairment of Property, Plant and Equipment

Impairment losses have been recognised on Mintek Property, Plant and Equipment at the reporting date. Impairment losses originated from assets previously used in research or commercial activities but it is forecasted that no future economic benefit will flow from these assets in the foreseeable future.

Catering, Building & Office Equipment	-	270,316
Plant, Machinery & Equipment	-	2,997,100
Total Impairment of Property, Plant and Equipment	-	3,267,416

A review of possible impairment was conducted in the current financial year but no impaired property, plant or equipment was identified at that point.

4. PROPERTY, PLANT AND EQUIPMENT (Continued)		
	2023	2022
	R	R

4.3 Change in Estimate - Useful Life of Property, Plant and Equipment reviewed

The Entity reassesses the useful life of all assets at period end. For items that are still in use and have future economic value, the useful lives are 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 R38,465,101 (2022: R92,751,993).

The change in the estimated useful life of various assets of the Entity, as indicated in Note 27., has resulted in the following decreases in depreciation for the financial year:

Buildings	-	73,453
Catering, Building & Office Equipment	596,869	679,378
Computer Equipment	1,557,427	6,157,684
Furniture & Fittings	125,364	658,465
Motor Vehicles	141,258	287,145
Plant, Machinery & Equipment	5,032,593	14,041,383
Total Change in Estimate for Useful Life of Property, Plant and Equipment	7,453,511	21,897,508

The change in estimates will result in an increase of R7,453,511 in the depreciation expense for the Entity over the next three financial years.

4.4 Land and Buildings carried at Revalued Amount

The value of the land and building complexes were estimated by Sheldon Gordon trading as Resurgent Projects, an independent retail estate broker, during the financial year ending 31 March 2021. The valuation is done every 5 years and the latest valuation report was issued on 21 April 2021. 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 11.0%.

The following assumptions were used:

Discount Rate	11.00%	11.00%
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Had the Entity's Land and Buildings (other than Land and Buildings included in a disposal group) been measured on a historical cost basis, their carrying amount would have been as follows:

Cost	66,933,784	66,933,784
Accumulated Depreciation	21,963,495	19,654,796
Net Carrying Value	44,970,289	47,278,988

4. PROPERTY, PLANT AND EQUIPMENT (Continued)

	2023	2022
	R	R

4.5 Revaluation Surplus

The Revaluation Reserve arises on the revaluation of Land and Buildings. Where revalued Land or Buildings are sold, the portion of the Revaluation Reserve that relates to that asset, and is effectively realised, is transferred directly to Accumulated Surplus.

The Revaluation Surplus is reconciled as follows:

Balance at beginning of year	167,611,742	169,754,269
Depreciation offset to Income Statement	(2,142,527)	(2,142,527)
Balance at end of year	165,469,214	167,611,742

4.6 Work-in-Progress

The Entity has incurred expenditure on capital projects which were not completed at year-end. The details of the carrying amounts of expenditure included in each class of assets are listed below:

Buildings	127,276	19,061,149
Catering, Building & Office Equipment	3,512	1,626,268
Plant, Machinery and Equipment	24,461,766	24,174,571
Total Carrying Amounts of Work-in-Progress	24,592,554	44,861,988

4. PROPERTY, PLANT AND EQUIPMENT (Continued)

	2023	2022
	R	R

4.7 Delayed Projects

The Entity has projects that are currently experiencing delays or were halted. For each project, the reason for the delay or halting of the project are noted. The carrying amount of those assets included in the balance of Property, Plant and Equipment are listed below:

Project Details	Delayed or Halted		
Other equipment: Batch Autoclave	Delayed	1,683,805	1,581,354
Reason: The project encountered delays in 2022 due to resource constraints in execution of the project.			
Plant: TiMag Rotary kiln and demonstration plant	Delayed	21,536,778	21,536,778
Reason: Delays were experienced in 2022 on this project as a result of intricate design work required, procurement delays and limited resource availability due to retirements.			
Buildings: ASD Upgrade Phase 2	Completed	-	19,061,149
Reason: The project as disclosed as delayed in the previous financial year, was completed in April 2022 and capitalised in the 2023 financial year.			
Total Carrying Amounts of Delayed or Halted Projects		23,220,583	42,179,281

4.8 Expenditure incurred to Repair and Maintain Property, Plant and Equipment

The following specific costs included in the amount of Repairs and Maintenance were incurred by Entity during the reporting period:

Consumables	4,086,356	5,439,159
Equipment Service Cost	3,781,113	3,461,696
Repairs & Maintenance: Contractors	1,564,617	3,903,684
Repairs & Maintenance: Labour	2,558,097	1,477,238
Other Repairs and Maintenance	254,536	555,891
Total Expenditure incurred to Repair and Maintain	12,244,718	14,837,668

5. INTANGIBLE ASSETS

	2023	2022
	R	R
At Cost less Accumulated Amortisation and Accumulated Impairment Losses	2,856,754	3,363,840
The movement in Intangible Assets is reconciled as follows:		
Computer Software:		
Carrying values at 01 April 2022	3,363,840	3,792,455
Cost	9,675,993	9,343,035
Accumulated Amortisation	(6,174,030)	(5,412,457)
Accumulated Impairment Losses	(138,123)	(138,123)
Acquisitions:	-	758,506
Purchased	-	758,506
Amortisation:	(233,797)	(1,055,046)
- Standard Amortisation	(1,433,350)	(1,884,511)
- Re-Assessment: Change in Estimate	1,199,553	829,465
Disposals:	(289,559)	(280,719)
At Cost	(982,876)	(574,192)
At Accumulated Amortisation	693,317	293,473
Transfers:	16,270	148,644
At Cost	29,699	148,644
At Accumulated Amortisation	(13,429)	-
Carrying values at 31 March 2023	2,856,754	3,363,840
Cost	8,722,816	9,675,993
Accumulated Amortisation	(5,727,939)	(6,174,030)
Accumulated Impairment Losses	(138,123)	(138,123)

The amortisation expense has been included in the line item "Depreciation and Amortisation" in the Statement of Financial Performance see Note 18.

All of the Entity's Intangible Assets are held under freehold interests and no Intangible Assets had been pledged as security for any liabilities of the Entity.

5. INTANGIBLE ASSETS (Continued)

	2023	2022
	R	R

5.1 Change in Estimate - Useful Life of Intangible Assets reviewed

The Entity reassesses the useful life of all assets at period end. For items that are still in use and have future economic value, the useful lives are 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 R5,152,248 (2022: R4,308,352).

The change in the estimated useful life of various assets of the Entity, as indicated in Note 27., has resulted in the following decreases in depreciation for the financial year

Computer Software:	1,199,553	829,465
Total Change in Estimate for Useful Life of Intangible Assets	1,199,553	829,465

The change in estimates will result in an increase of R1,199,553 in the amortisation expense for the Entity over the next three financial years.

6. NON-CURRENT INVESTMENTS**Unlisted**

Investment in Controlled Entities - at cost	100	100
	100	100

Total Non-current Investments**Board's valuation of Unlisted Investments**

Investment in Controlled Entities	100	100
	100	100

Unlisted Investments comprise the following:

(i) Investments in Controlled Entities as described on below.

6.1 Investment in Controlled Entities

The Entity exercises control in the following company, which has been dormant for several years, where the value of the investment is considered to be R100 as the company does not have share capital which can be valued in an open market:

Mindev (Pty) Ltd:		
Issued Share Capital (R)	100	100
Percentage controlled by Board (%)	100.00%	100.00%
Non-Current Liabilities	39,515,043	39,515,043

The Entity's maximum liability towards the Controlled Entity is R100.

Ketlaphela Medical Diagnostics (Pty) Ltd was registered during the 2021 financial year. Mindev (Pty) Ltd holds 100% shares in this company. During the 2022 financial year, the name was changed to PhilisaSechaba Healthcare (Pty) Ltd.

Both Mindev and PhilisaSechaba Healthcare (Pty) Ltd was dormant during the year under review.

7. PROVISIONS

	2023	2022
	R	R
Warrantees	318,609	705,286
Total Provisions	318,609	705,286

Warrantees arise from Mintek recognising its probable liability for meeting its obligation in terms of products and services as stipulated in its contracts with its customers. The provision is an estimate of the amount due at the reporting date.

The movement in provisions are reconciled as follows:

Current Provisions:**Warrantees:**

Balance at beginning of year	705,286	1,882,351
Warranty additions	318,609	705,287
Amounts reversed during the year	(705,286)	(1,882,352)
Balance at end of year	318,609	705,286

8. PAYABLES FROM EXCHANGE TRANSACTIONS

	2023	2022
	R	R
Trade Creditors	46,853,790	20,708,557
Income Received In Advance	36,424,339	14,051,032
Accruals	29,725,141	19,979,262
Deposits	26,798	26,798
VAT Payable	11,566,872	5,551,984
Salary Related Payables	10,725,094	9,959,253
Staff Bonus Accrual	11,743,610	23,415,517
Staff Leave Accrual	12,573,555	11,577,234
Total Payables	159,639,198	105,269,636

Trade Creditors:

Trade Creditors are in respect of amounts due to suppliers for services rendered and goods supplied. The average credit period on purchases from Trade Creditors is 35 (2022: 43) days. Creditors are paid within 30 days from receipt of invoice as required by Treasury Regulations.

No interest is charged for the first 30 days from the date of receipt of the invoice. Thereafter interest is charged in accordance with the credit policies of the various individual creditors that the Entity deals with.

Income Received in Advance:

Income Received in Advance relates to billing in advance on projects where work is yet to be completed.

Accruals:

Accruals are recognised for known amounts owing to suppliers where invoices have not yet been received.

Deposits:

Deposits are in respect of amounts held for tenants that have lease agreements with Mintek.

Salary Related Payables:

Salary Related Payables relates to amounts owing to third parties such as medical aids, provident fund and SARS for PAYE, UIF and SDL at year-end.

Staff Bonus Accrual:

Employees may elect to structure a bonus as part of their total package. This accrual relates to bonuses that have accrued at year-end. Also included in this balance is a provision for performance bonuses which has been provided for in terms of the Mintek Remuneration Policy.

Staff Leave Accrual:

The Leave Accrual relates to the value of vacation leave for staff at year-end.

The Entity's liquidity risk management processes are disclosed in Note 32.6 to the Annual Financial Statements.

9. CASH RECEIVED IN ADVANCE FROM GOVERNMENT

	2023	2022
	R	R
9.1 Cash Received in Advance from Government		
DMRE - MTEF Conditional Grant	20,158,299	33,914,715
DMRE - Asbestos Rehabilitation Project	119,261,754	130,267,168
Other government departments and entities	46,624,596	37,594,466
Total Cash Received in advance from Government	186,044,650	201,776,349

The prior year amount for Cash Received in Advance from Government has been adjusted. Refer to Note 26.3 on "Correction of Error" for details of the restatement. The grants are project related where conditions are yet to be fulfilled. The Cash Received in advance are invested in ring-fenced investment accounts until utilised.

The Cash received in advance are cash backed by term deposits. The Entity complied with the conditions attached to all grants received to the extent of revenue recognised. No grants were withheld.

10. EMPLOYEE BENEFIT LIABILITIES**10.1 Post-retirement Health Care Benefits Liability**

Non-current Liabilities	5,854,472	6,819,729
Current Liabilities	1,180,634	1,580,271
Carrying Value		
Present Value of the defined benefit obligation - wholly unfunded	7,035,106	8,400,000

Medical cover is provided to employees 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. The short term portion of this liability relates to an estimated value for employees who will be retiring in the next 12 months. Periodic valuation of this obligation is carried out by an independent actuary every year, latest one being 31 March 2023.

The most recent actuarial valuations of plan assets and the present value of the defined benefit obligation were carried out at 31 March 2023 by Mr S Basadien, Member of the Actuarial Society of South Africa. The present value of the defined benefit obligation, and the related current service cost and past service cost, were measured using the Projected Unit Credit Method.

The members of the Post-employment Health Care Benefit Plan are made up as follows:

In-service Members (Employees)	22	26
Continuation Members (Retirees, widowers and orphans)	8	8
Total Members	30	34

10. EMPLOYEE BENEFIT LIABILITIES (Continued)

	2023	2022
	R	R
The liability in respect of past service has been estimated as follows:		
In-service Members	3,485,106	4,800,000
Continuation Members	3,550,000	3,600,000
Total Liability	7,035,106	8,400,000

The Interest Cost for the year ending 31 March 2023 is estimated to be R900,000, whereas the cost for the ensuing year is estimated to be R710,000 (31 March 2022: R900,000 and R900,000 respectively).

The principal assumptions used for the purposes of the actuarial valuations were as follows:

Discount Rate - In-service Members	11.90%	10.90%
Discount Rate - Continuation Members	10.10%	9.80%
Health Care Cost Inflation Rate - In-service Members	8.20%	7.80%
Health Care Cost Inflation Rate - Continuation Members	7.00%	7.50%
Expected Retirement Age	60	60

General:

Fixed investment held with various financial institutions is partly earmarked as financing for post-retirement medical aid liability. Mintek has not as-signed a specific fund to hedge the post-retirement medical aid liability.

Movements in the present value of the Defined Benefit Obligation were as follows:

Balance at the beginning of the year	8,400,000	9,042,013
Interest cost	900,000	900,000
Past-service costs	(188,258)	(193,707)
Settlements paid	(1,324,461)	(2,048,326)
Actuarial losses / (gains)	(752,175)	700,020
Total Recognised Benefit Liability	7,035,106	8,400,000

The amounts recognised in the Statement of Financial Position are as follows:

Present value of fund obligations	7,035,106	8,400,000
Unfunded Accrued Liability	7,035,106	8,400,000
Total Benefit Liability	7,035,106	8,400,000

10. EMPLOYEE BENEFIT LIABILITIES (Continued)

	2023	2022
	R	R
The amounts recognised in the Statement of Financial Performance are as follows:		
Interest cost	900,000	900,000
Actuarial losses / (gains)	(752,175)	700,020
Vested past service costs	(188,258)	(193,707)
Total Post-retirement Benefit included in Employee Related Costs (Note 17).	(40,433)	1,406,313

The effect of a 1% movement in the assumed rate of health care cost inflation is as follows:

Increase:		
Effect on the aggregate of the current service cost and the interest cost	(360,000)	(700,000)
Effect on the defined benefit obligation	830,000	900,000
Decrease:		
Effect on the aggregate of the current service cost and the interest cost	860,000	1,000,000
Effect on the defined benefit obligation	(360,000)	(700,000)

There are no additional contributions made to this benefit plan as it merely relates to a vested benefit that accrues to qualifying employees that were in employ on 31 December 1999.

11. RESERVES

Revaluation Reserve	165,469,214	167,611,742
Total Reserves	165,469,214	167,611,742

11.1 Revaluation Reserve

The Revaluation Reserve arises on the revaluation of Land and Buildings. Where revalued Land or Buildings are sold, the portion of the Revaluation Reserve that relates to that asset, and is effectively realised, is transferred directly to Accumulated Surplus.

Reconciliation of the Revaluation Reserve:

Balance at beginning of year	167,611,742	169,754,268
Depreciation transferred to surplus	(2,142,527)	(2,142,527)
Balance at end of year	165,469,214	167,611,742

Refer to Statement of Changes in Net Assets for more detail and the movement on Reserves.

12. GOVERNMENT GRANTS AND SUBSIDIES

	2023	2022
	R	R
Grants:		
MTEF	13,756,417	8,501,117
SciVote	282,569,565	260,677,391
Total Government Grants and Subsidies	296,325,981	269,178,509

13. RENDERING OF SERVICES

Contract Research	51,088,479	74,477,618
Products and Services	137,956,207	131,444,654
Contract Revenue - Asbestos Rehabilitation	122,480,417	101,534,624
Contract Revenue - Other	11,882,791	14,384,116
Total Rendering of Services	323,407,894	321,841,012

The prior year amount for Rendering of Services has been restated. Refer to Note 25.2 on "Correction of Error" for details of the restatement.

14. RENTAL OF FACILITIES AND EQUIPMENT

External Investments:		
Rental Revenue from Conference Venue	53,229	17,391
Rental Revenue from Land and Buildings	3,382,335	3,451,244
Total Rental of Facilities and Equipment	3,435,564	3,468,635

Rental revenue earned on Facilities and Equipment is in respect of Non-financial Assets rented out.

15. INTEREST EARNED

Interest from Non-Exchange Transactions		
Call Account and Fixed Term Deposits	888,759	418,066
Interest from Exchange Transactions		
External Investments:		
Bank Account	966,303	8,880
Call Account and Fixed Term Deposits	20,142,561	13,413,527
Total Interest Earned	21,108,865	13,422,406
	21,997,624	13,840,472

16. OTHER REVENUE

	2023	2022
	R	R
Bad Debt Recovered	32,961	21,280
Library Income	1,722	7,400
Sale of Scrap Material	75,485	130,359
Sundry Income	4,119,511	2,030,105
Tender Fee Income	64,955	60,500
Total Other Revenue	4,294,634	2,249,644

The amounts disclosed above for Other Revenue are in respect of services rendered which are billed to or paid for by the users and is ancillary to the core business of Mintek.

17. EMPLOYEE RELATED COSTS**Employees:**

Basic Salaries	302,612,956	306,375,412
Overtime	4,563,993	2,167,760
Social Contributions (Medical Aid, Pension, UIF, etc)	1,741,226	1,537,852
Leave Accrual	2,574,018	2,379,073
Other Employee related costs	570,935	414,090
Total Employee Related Costs	312,063,127	312,874,187

18. DEPRECIATION AND AMORTISATION

Depreciation: Property, Plant and Equipment	1,433,350	1,884,511
Amortisation: Intangible Assets	37,811,070	30,380,321
Total Depreciation and Amortisation	39,244,420	32,264,832

19. IMPAIRMENT LOSSES

	2023	2022
	R	R
Capital Assets	-	3,267,416
Financial Assets	1,137,355	753,777
Total Impairment Losses	1,137,355	4,021,194

19.1 Impairment Losses on Fixed Assets

No impaired capital assets were identified during the 2023 financial year hence no values for 2023.

Impairment Losses Recognised:

<i>Property, Plant and Equipment</i>	-	3,267,416
Impairment losses Recognised	-	3,267,416

19.2 Impairment Losses on Financial Assets

Receivables from Exchange Transactions		
Impairment Losses Recognised	1,227,780	756,787
Impairment Losses reversed	(90,425)	(3,009)
Total Impairment Losses	1,137,355	753,777

Total Impairment Losses

1,137,355 **4,021,194**

20. BURSARY COSTS

Post-graduates	1,937,344	1,811,184
TTS	724,826	2,122,627
Undergraduates	484,264	690,013
Total Bursary Costs	3,146,433	4,623,825

21. FINANCE COSTS

Supplier interest	19,199	736,192
Defined Benefit Liabilities	900,000	900,000
Total Finance Costs	919,199	1,636,192

22. PROFESSIONAL SERVICES

Auditor's Remuneration	4,136,762	2,879,761
Professional Consultancy Services	16,807,254	6,620,516
Legal Fees	3,379,970	7,918,440
Total Professional Services	24,323,986	17,418,717

23. REHABILITATION SERVICES

	2023	2022
	R	R
Asbestos Rehabilitation	95,161,856	75,243,847
Total Rehabilitation Services	95,161,856	75,243,847

Rehabilitation services relates to costs incurred on the Asbestos Rehabilitation projects and mainly consist of payments made to contractors for work performed in execution of these rehabilitation of derelict and ownerless asbestos mines and sealing of the holings.

24. GENERAL EXPENSES

Included in General Expenses are the following:

Bank Charges	235,427	305,328
Cellphone, Telephone and Data Costs	1,179,380	1,425,987
Consumables	39,529,276	40,044,498
Contracted Services	34,926	139,812
Utility Costs	21,930,587	19,487,622
Equipment Service Costs	3,781,113	3,461,696
Fuel and Oil	5,454,203	1,010,997
Gardening Services	485,000	33,072
Health and Safety Costs	1,847,212	1,938,562
Insurance	2,738,216	2,453,015
IT Support Costs	14,566,848	13,327,949
Laboratory Analysis	4,087,941	2,350,948
Licence Fees - Software	15,289,817	10,419,962
Marketing Expenses	495,203	552,665
Membership and Subscription Fees	4,076,668	3,943,183
Postage and Courier Costs	733,730	369,507
Rental of Facilities and Equipment	1,219,832	1,727,490
Repairs and Maintenance - Labour	2,558,097	2,033,129
Repairs and Maintenance Contractors	1,564,617	3,903,684
Research support to Tertiary Institutions	9,348,921	10,110,951
Security Services	4,946,964	4,767,694
Skills Development Levies	2,916,260	2,621,770
Training and Staff development	5,996,866	4,501,975
Travel and Accommodation	8,803,239	2,595,733
Vehicle Expenses	592,830	239,056
Warranty Provision	(386,677)	(1,177,067)
Other General Expenses	11,444,453	9,614,448
Total General Expenses	165,470,952	142,203,670

The amounts disclosed above for Other General Expenses are in respect of costs incurred in the general management of the Entity and not directly attributable to a specific service or class of expense.

25. GAINS/ LOSSES ON DISPOSAL OF CAPITAL ASSETS

	2023	2022
	R	R
Assets Disposed at Carrying Value:		
Losses on Disposal of PPE	(724,650)	(1,760,076)
Losses on Disposal of Intangible Assets	(289,559)	(280,719)
Total Losses on Disposal of Capital Assets	(1,014,210)	(2,040,795)

26. CORRECTION OF ERROR

Corrections were made to revenue, cash received in advance from government and on disclosures of the previous financial year. Details of the corrections are described below:

26.1 Reclassification of Accumulated Surplus

The prior year figures of Accumulated Surplus has been restated to correctly disclose the monies held by the Entity in terms of the disclosure notes indicated below.

The effect of the changes are as follows:

	Accumulated Surplus
Balances published as at 31 March 2021	418,821,432
Correction of Error:-	
Recognition of revenue related to prior years	4,180,870
Restated Balances as at 31 March 2021	423,002,302
Transactions incurred for the Year 2021/22	11,279,671
Correction of Error:-	
Recognition of revenue related to prior years	10,500,273
Restated Balances as at 31 March 2022	444,782,245

26.2 Reclassification of Revenue

The prior year figures of Revenue have been restated to recognise revenue that were not previously billed.

The effect of the Correction of Error is as follows:

	Prior Year AFS 2021/22 Revenue	Current Year AFS 2021/22 Revenue	Restated Amount
Government Grants and Subsidies Received	269,178,509	269,178,509	-
Interest Earned from Non-Exchange Transactions	418,066	418,066	-
Rendering of Services	311,340,741	321,841,012	10,500,271
Rental of Facilities and Equipment	3,468,635	3,468,635	-
Interest Earned from Exchange Transactions	13,422,406	13,422,406	-
Discount Received	114,950	114,950	-
Other Revenue	2,249,644	2,249,644	-
	600,192,951	610,693,222	10,500,271

Prior year amounts of items in **Revenue** included in the Statement of Financial Performance have been restated as indicated below:

26. CORRECTION OF ERROR (Continued)

	Rendering of Services
Balance previously reported	311,340,741
Recognition of revenue relating to 2022	10,500,271
	<hr/>
Restated Balance now reported	321,841,012

The prior year amounts for Contract Revenue - Rehabilitation amounting to R10,500,271 have been recognised retrospectively for work that was performed in that year but not billed.

26.3 Reclassification of Statement of Financial Position

The prior year figures of Cash Received in Advance from Government have been restated to reflect the prior year error.

The effect of the Correction of Error is as follows:

	Prior Year AFS 2021/22 Balance	Current Year AFS 2021/22 Balance	Restated Amount
Current Liabilities			
Provisions	(705,286)	(705,286)	-
Payables from Exchange Transactions	(105,269,630)	(105,269,636)	(6)
Unspent Conditional Grants and Receipts	(216,457,490)	(201,776,349)	14,681,141
Current Portion of Long-term, Liabilities	(1,580,271)	(1,580,271)	-
Net Assets			
Reserves	(167,611,742)	(167,611,742)	-
Accumulated Surplus	(430,101,102)	(444,782,245)	(14,681,143)
	<hr/>	<hr/>	<hr/>
	-	-	-

26. CORRECTION OF ERROR (Continued)

Opening balances and prior year amounts of items in the Statement of Financial Position have been restated as indicated below:

	Cash Received from Government
Balances previously published per AFS as at 31 March 2021	(208,821,677)
Recognition of revenue related to prior years	4,180,870
	<hr/>
Balances now published per AFS as at 31 March 2022	(204,640,807)
Transactions incurred for the Year	(7,635,814)
Recognition of revenue relating to 2022	10,500,271
	<hr/>
Balances now published per AFS as at 31 March 2022	(201,776,349)

Cash Received in advance from Government:

The **prior year amounts** of Cash Received in advance from Government have been restated to account for revenue not recognised in previous years.

26.4 Restatement of Cash Flow Statement

The prior year figures of Classes in the Cash Flow Statement have been restated to correctly classify the Cash Flows from Operating Activities, Cash Flows from Investing Activities, Cash Flows from Financing Activities and Net Increase/ (Decrease) In Cash and Cash Equivalents of the Entity. It was also restated to account for revenue previously not recognised and the effect thereof on the Cash Received in Advance from Government class.

The effect of the Correction of Error is as follows:

	Prior Year 2022 Balance	Current Year 2022 Balance	Amount Restated by
Cash Flows from Operating Activities - Receipts			
Government Grant and Subsidies	279,631,329	274,997,391	(4,633,938)
Receipts from Rendering of Services	303,575,985	308,209,922	4,633,938
Interest Received	13,840,472	13,840,472	-
Other Receipts	5,608,141	5,608,141	-
	<hr/>	<hr/>	<hr/>
	-	-	-

26. CORRECTION OF ERROR (Continued)

Prior year amounts of Items in the Cash Flow Statement have been restated as indicated below:

Cash Flows from Operating Activities - Receipts:	Government Grants & Receipts	Rendering of Services
Balance previously reported	279,631,329	303,575,985
Reclassification of cashflow impact of Cash received in advance not related to MTEF	(4,633,938)	4,633,938
Rounding Differences	-	(1)
Restated Balance now reported	274,997,391	308,209,922

Government Grants & Receipts:

The **prior year amounts** for Government Grants & Receipts have been reclassified to correctly disclose the revenue, adjusted for non-movements and movements in financial assets and liabilities allocated to Government Grants & Receipts. The effect of these reclassifications on net Cash Flow is zero.

Rendering of Services:

The **prior year amounts** for Rendering of Services have been reclassified to correctly disclose the revenue, adjusted for non-cash movements and movements in financial liabilities allocated to Rendering of Services. The effect of this reclassification on net Cash Flow is zero.

26.5 Restatement of Notes**Operating Lease Commitment**

Prior year amounts have been restated in Note 31. Operating lease commitment for 2 to 5 years to reflect actual amount

The effect of the Correction of Error is as follows:

Other Equipment:	Prior Year 2022 Amount	Current Year 2022 Amount	Amount Restated by
Up to 1 year	943,822	943,822	-
2 to 5 years	1,494,385	550,563	(943,822)
Total Operating Lease Arrangements	1,494,385	1,494,385	-

Related Party transactions

Prior year amounts have been restated in Note 33.2.1 Income received from related parties to reflect prior year revenue adjustments made.

	Prior Year 2022 Amount	Current Year 2022 Amount	Amount Restated by
Deferred income			
Department of Mineral Resources and Energy -Asbestos	144,948,309	130,267,168	(14,681,141)
Revenue			
Department of Mineral Resources and Energy -Asbestos	91,034,353	101,534,624	10,500,271

27. CHANGE IN ACCOUNTING ESTIMATES

	2023	2023
	R	R

27.1 Depreciation/Amortisation Expenditure:

The residual values, estimated useful lives and depreciation methods were reviewed at 31 March 2023. For items that are still in use and have future economic value, useful life was extended. The useful lives were extended based on the assumptions that assets will be replaced in the next two years due to the capitalisation plan. The original acquisition value for these assets were R38,465,101 and the resultant depreciation write-back was R8,653,064 of which R7,453,512 relates to property, plant and equipment and R1,199,553 relates to intangible assets.

The adjustments are as follows:

Decrease in Depreciation and Amortisation due to adjustments to Useful Lives of PPE and Intangible Assets	(8,653,064)	(22,726,973)
Decrease in Depreciation of PPE and Intangible Assets	(8,653,064)	(22,726,973)
Depreciation as previously stated - before change in useful lives	47,897,481	54,991,797
Adjustment due to Change in Accounting Estimate	(8,653,064)	(22,726,973)
Depreciation as per Note 18.	39,244,417	32,264,824

The effect per asset class is reflected in notes 4 and 5 in the financial statements. The amount of the effect in future periods is not disclosed as it is impracticable to estimate.

28. CASH GENERATED BY OPERATIONS

	2023	2022
	R	R
Surplus for the Year	4,880,235	19,637,414
Adjustment for Non-cash Transactions included in Surplus:		
Employee Related Costs	2,385,759	1,450,673
Depreciation and Amortisation	39,244,417	32,264,824
Impairment Losses on Capital Assets	-	3,267,416
Impairment Losses on Financial Assets	1,137,355	753,77
Finance Costs	900,000	1,634,693
General Expenses	(386,677)	(1,177,067)
Losses on Other Operations	(1,967,094)	2,337,506
Contributions included in Payables from Exchange Transactions	(2,574,018)	(2,379,073)
Adjustment for Cash Transactions not included in Surplus:		
Exchange Receivables: Bad Debts Written-off	(677,203)	(1,140,886)
Disposal of Property, Plant and Equipment	724,650	1,760,076
Disposal of Intangible Assets	289,559	280,719
Expenditure incurred from Employee Benefit Liabilities	(1,324,461)	(2,048,326)
Adjustment for Transactions included in Surplus / Deficit directly recognised in Cash Flow:		
Unrealised Foreign Exchange Gains / (Losses)	1,214,920	(1,637,486)
Operating surplus before working capital changes	43,847,440	55,004,265
Increase in Inventories	(4,710,302)	(2,102,290)
Increase in Receivables from Exchange Transactions	(18,788,963)	(2,636,538)
Increase/(decrease) in Payables from Exchange Transactions	54,369,562	(10,384,920)
Decrease in Cash Received in Advance from Government	(15,731,700)	(2,864,457)
Cash generated by Operations	58,986,037	37,016,060

The prior year amount for Surpluses and Cash Received in Advance has been restated. Refer to Note 2.6.2 on "Correction of Error" for details of the restatement.

29 NON-CASH INVESTING AND FINANCING TRANSACTIONS

The Entity did not enter into any Non-cash Investing and Financing Transactions during the 2022/2023 Financial year.

30. IRREGULAR, FRUITLESS AND WASTEFUL EXPENDITURE DISALLOWED

	2023	2022
	R	R
Fruitless and Wasteful expenditure current year	753,891	1,499
Irregular Expenditure - Identified in prior year, paid in current year	16,609,221	6,808,770
Irregular Expenditure - Identified in current year	588,398	1,850,553
Closing Balance	17,951,510	8,660,822

Disciplinary Steps / Criminal Proceedings**Fruitless and Wasteful Expenditure 2023**

The fruitless and wasteful expenditure relates to interest paid on an arbitration award as disclosed in the 2021/2022 Financial statements. The determination test concluded that this does not meet the definition of Fruitless and Wasteful expenditure which is supported by the National Treasury view which states " .. that the transaction below does not meet the definition of fruitless and wasteful expenditure. The view is premised on the fact that interest in question was part or built into the arbitration agreement."

Fruitless and Wasteful Expenditure 2022

The matter as disclosed in the 2021/2022 AFS relating to the settlement agreement that was concluded during the 2020/2021 financial year amounting to R5,313,250 relating to gas consumption was sent for determination. It was concluded that the arbitration agreement does not meet the definition of fruitless and wasteful expenditure and the process for removal of this issue will be finalised in the coming financial year.

Irregular Expenditure 2023

The irregular expenditure disclosed in the current year relates to incidents identified in previous financial years and the process in terms of the Irregular Expenditure Framework is currently underway.

Only one instance of irregular expenditure has been identified in the current year.

Criminal or disciplinary steps taken as a result of losses, irregular and fruitless and wasteful expenditure

INCIDENT DESCRIPTION	2023	2022
Completed and officials disciplined	5	0
Disciplinary process in progress	8	18
Investigation completed. Process for removal from Irregular Expenditure register in progress	5	0

31. COMMITMENTS FOR EXPENDITURE

	2023	2022
	R	R

31.1 Capital Commitments

Commitments in respect of Capital Expenditure:

Approved and Contracted for:-

	49,506,992	3,736,580
Computer Equipment	23,653,800	-
Plant, Machinery and Equipment	25,824,615	3,736,580
Other Assets	28,577	-

Total Capital Commitments

	49,506,992	3,736,580
--	-------------------	------------------

This expenditure will be financed from current reserves.

Own Resources	49,506,992	3,736,580
	49,506,992	3,736,580

31.2 Commitments in respect of Operational Expenditure**Approved and Contracted for:-**

Operational Expenditure	72,311,156	78,861,357
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Total Operational Commitments

	72,311,156	78,861,357
--	-------------------	-------------------

This expenditure will be financed from current reserves

Own Resources	72,311,156	78,861,357
	72,311,156	78,861,357

31.3 Operating Lease Commitments

At the reporting date the Entity has outstanding commitments under Operating Leases which fall due as follows:

31.3.1 Arrangements as Lessee:

Operating Leases relate to Property, Plant and Equipment with lease terms not longer than 5 years, with an option to extend for a further period. All operating lease contracts contain market review clauses in the event that the Entity exercises its option to renew.

31.3.2 Amounts payable under Operating Leases:

At the Reporting Date the Entity had outstanding commitments under Non-cancellable Operating Leases for Property, Plant and Equipment, which fall due as follows:

	550,563	1,494,385
Other Equipment:		
Up to 1 year	550,563	943,822
2 to 5 years	-	550,563
More than 5 years	-	-
Total Operating Lease Arrangements	550,563	1,494,385

In the 2022 AFS the 2 to 5 year for 2022 was erroneously disclosed as R1,494,385. The correct amount is R550,563. This error is disclosed in 26 ..

32. FINANCIAL INSTRUMENTS

	2023	2022
	R	R

32.1 Classification**FINANCIAL ASSETS:**

In accordance with GRAP 104.13 the Financial Assets of the Entity are classified as follows:

Financial Assets at Cost:

Non-current Investments	Unlisted Investments	100	100
Financial Assets at Cost:			
Receivables from Exchange Transactions	Trade Debtors	22,010,495	23,722,234
Receivables from Exchange Transactions	Deposits	275,093	275,093
Receivables from Exchange Transactions	Government Debtors	4,720,260	1,808,811
Receivables from Exchange Transactions	Project Work-in-Progress	24,628,919	18,477,100
Receivables from Exchange Transactions	Staff Debtors	2,784,471	1,987,504
Cash and Cash Equivalents	Fixed Deposits	463,800,035	386,642,860
Cash and Cash Equivalents	Bank Balances	43,905,131	75,087,418
Cash and Cash Equivalents	Cash Floats and Advances	30,465	21,710
Total Financial Assets		562,154,969	508,022,830

FINANCIAL LIABILITIES:

In accordance with GRAP 104.13 the Financial Liabilities of the Entity are classified as follows:

Financial Liabilities at Amortised Cost:

Long-term Liabilities	Other Loans	39,515,043	39,515,043
Payables from Exchange Transactions	Trade Creditors	46,853,790	20,708,557
Payables from Exchange Transactions	Accruals	29,725,141	19,979,262
Payables from Exchange Transactions	Deposits	26,798	26,798
Payables from Exchange Transactions	VAT Payable	11,566,872	5,551,984
Payables from Exchange Transactions	Salary Control	10,725,094	9,959,253
Payables from Exchange Transactions	Staff Bonus Accrual	11,743,610	23,415,517
Payables from Exchange Transactions	Staff Leave Accrual	12,573,555	11,577,234
Cash Received in Advance from Government	Deferred: Government Grants	186,044,650	201,776,349
Total Financial Liabilities		348,774,552	332,509,997

No Financial Instruments of the Entity have been reclassified during the year.

32.2 Capital Risk Management

The Entity manages its capital to ensure that the Entity will be able to continue as a going concern while delivering sustainable goods and services to customers through the optimisation of the debt and equity balance. Mintek's overall strategy remains unchanged in 2023

The capital structure of the Entity consists of debt comprising Accumulated Surplus as disclosed in the Statement of Changes in Net Assets.

32. FINANCIAL INSTRUMENTS (Continued)

	2023	2022
	R	R

Gearing Ratio

The gearing ratio at the year-end was as follows:

Debt	39,515,043	39,515,043
Net Debt	39,515,043	39,515,043
Equity	656,789,164	651,908,930
Net debt to equity ratio	6.02%	6.06%

Debt is defined as Long-term Liabilities, together with its Short-term Portion.

Equity includes all Funds and Reserves of the Entity, disclosed as Net Assets in the Statement of Financial Performance and Net Debt as described above.

32.3 Financial Risk Management Objectives

Mintek's overall risk management program focuses on the unpredictability of financial markets and seeks to minimise potential adverse effects on the Entity's financial performance. Risk management is carried out by management under policies approved by the Board. The Board of Directors sanctions a risk management policy which considers financial risk management in the organisation.

The Entity has limited foreign exchange risk.

Further quantitative disclosures are included throughout these Annual Financial Statements.

32.4 Significant Risks

It is the policy of the Entity to disclose information that enables the user of its Annual Financial Statements to evaluate the nature and extent of risks arising from Financial Instruments to which the Entity is exposed to on the reporting date.

The Entity has exposure to the following risks from its operations in Financial Instruments:

- Market Risk.
- Liquidity Risk; and
- Credit Risk;

32. FINANCIAL INSTRUMENTS (Continued)

	2023	2022
	R	R

Risks and exposures are disclosed as follows:

Market Risk

Market Risk is the risk that changes in market prices, such as foreign exchange rates, interest rates and equity prices will affect the Entity's income or the value of its holdings in Financial Instruments. The objective of market risk management is to manage and control market risk exposures within acceptable parameters, while optimising the return.

Liquidity Risk

Liquidity Risk is the risk that the Entity will encounter difficulty in meeting the obligations associated with its Financial Liabilities that are settled by delivering cash or another financial asset.

Credit Risk

Credit Risk is the risk of financial loss to the Entity if a customer or counterparty to a Financial Instrument fails to meet its contractual obligations and arises principally from the Entity's receivables from customers and investment securities.

32.5 Market Risk Management

The Entity's activities expose it primarily to the financial risks of changes in interest rates (see Note 32.7 below). No formal policy exists to hedge volatilities in the interest rate market.

There has been no change to the Entity's exposure to market risks or the manner in which it manages and measures the risk.

32.5.1 Foreign Currency Risk Management

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 Entity 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.

32. FINANCIAL INSTRUMENTS (Continued)

Counterparty and Location	31 March 2023		31 March 2022	
	Amount in Foreign Currency	Amount in Rands	Amount in Foreign Currency	Amount in Rands
Trade Debtors				
US Dollar	166,089	2,910,450	171,397	2,503,917
EUR	19,417	372,900	23,410	378,495
AUD	88,090	1,069,779	18,385	201,031
CAD	13,000	161,244	-	-
Cash and Cash Equivalents				
Bank Balances				
ABSA - USD Forex account	1,942,404	34,567,412	2,601,784	38,009,195
Petty Cash				
EUR	-	-	265	4,285
AUD	240	2,855	240	2,624
GBP	160	3,512	160	3,071
Trade Creditors				
US Dollar	3,709	67,339	900	13,154
EUR	46,420	947,650	5,882	95,101
AUD	2,350	29,145	8,040	97,913
GBP	2,345	44,805	-	-

Foreign risk exposure have been included in the 2023 financial statements for additional information.

32.5.2 Interest Rate Risk Management

Interest Rate Risk is defined as the risk that the fair value or future cash flows associated with a financial instrument will fluctuate in amount as a result of market interest changes.

Potential concentrations of interest rate risk consist mainly of variable rate deposit investments, other debtors, bank and cash balances.

The Entity limits its counterparty exposures from its money market investment operations by only dealing with well-established financial institutions of high credit standing.

Trade debtors comprise of a large number of customers, dispersed across different industries, geographical areas and countries. Trade debtors are presented net of a provision for impairment.

In the case of debtors whose accounts become in arrears, accounts are "handed over for collection" as applicable in terms of Board's Financial Policy.

Mintek is not exposed to credit interest rate risk as it has no borrowings.

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 Entity uses a mixture of variable and fixed interest rates. Refer to Note 3. of the Annual Financial Statements.

The Entity's exposures to interest rates on Financial Assets and Financial Liabilities are detailed in the Credit Risk Management section of this note.

32. FINANCIAL INSTRUMENTS (Continued)**Interest Rate Sensitivity Analysis**

The sensitivity analysis has been determined based on the exposure to interest rates at the Statement of Financial Position date. The analysis is prepared by averaging the amount of the investment at the beginning of the financial year and the amount of the investment at the end of the financial year. A 100 basis point increase or decrease was used, which represents management's assessment of the reasonably possible change in interest rates. The short-term financial instruments at year-end with variable interest rates are set out in Note 32.8 below:

Cash and Cash Equivalents:

If interest rates had been 25 basis points higher/ lower and all other variables were held constant, the Entity's:

Surplus for the year ended 31 March 2023 would have increased/ decreased by R1,211,794 (31 March 2022: R1,134,817). This is mainly attributable to the Entity's exposure to interest rates on its variable rate investments.

32.6 Liquidity Risk Management

Prudent liquidity risk management implies maintaining sufficient cash and marketable securities and the availability of funding through an adequate amount of committed credit facilities and the ability to close out market. Mintek's risk to liquidity is a result of the funds necessary to cover future commitments. The Entity manages liquidity risk through an ongoing review of future commitments and available funds. Cash flow forecasts are prepared to ensure adequate utilisation and optimisation of funds.

32.7 Credit Risk Management

Credit Risk refers to the risk that a counterparty will default on its contractual obligations resulting in financial loss to the Entity. The Entity has a sound debt management policy and obtains sufficient collateral, where appropriate, as a means of mitigating the risk of financial loss from defaults. The Entity uses its own trading records to assess its major customers. The Entity's exposure of its counterparties are monitored regularly.

Potential concentrations of credit rate risk consist mainly of trade debtors, variable rate deposit investments, bank and cash balances.

Investments/Bank, Cash and Cash Equivalents

The Entity limits its counterparty exposures from its money market investment operations (financial assets that are neither past due nor impaired) by only dealing with major banks with high quality credit standing and limits exposure to any one counterparty. No investments with a tenure exceeding twelve months are made.

Trade and Other Receivables

Trade Receivables comprise a widespread customer base. Management evaluates credit risk relating to customers on an ongoing basis. If customers are independently rated, these ratings are used. Otherwise, if there is no independent rating, risk control assesses the credit quality of the customer, taking into account its financial position, past experience and other factors. Individual risk limits are set based on internal or external ratings in accordance with limits set by the Board. The utilisation of credit limits is regularly monitored.

There were no material changes in the exposure to credit risk and its objectives, policies and processes for managing and measuring the risk during the year under review. The Entity's maximum exposure to credit risk is represented by the carrying value of each financial asset in the Statement of Financial Position, without taking into account the value of any collateral obtained. The Entity has no significant concentration of credit risk, with exposure spread over a large number of students, and is not concentrated in any particular sector or geographical area.

Mintek establishes an allowance for impairment that represents its estimate of anticipated losses in respect of trade receivables.

32. FINANCIAL INSTRUMENTS (Continued)**32.7 Credit Risk Management****Trade and Other Receivables (continued)**

The Entity does not have any significant credit risk exposure to any single counterparty or any group of counterparties having similar characteristics. The Entity defines counterparties as having similar characteristics if they are related entities. The credit risk on liquid funds is limited because the counterparties are banks with high credit-ratings.

The table below shows the balance of the 5 major counterparties at the balance sheet date. Management is of the opinion that, although these parties are the 5 counterparties with highest outstanding balances, no significant credit risk exposure exists based on the payment history of the parties.

Counterparty and Location	31 March 2023		31 March 2022	
	Credit Limit R	Carrying Amount R	Credit Limit R	Carrying Amount R
Dwarsrivier Chrome Mine (PTY) LTD South Africa	4,000,000	4,459,641	725,000	475,288
Anglo Corporate Services South Africa	5,000,000	3,570,739	3,000,000	8,149,749
Process IQ Australia	4,000,000	3,176,749	6,124,814	3,178,545
Palabora Copper (PTY) LTD South Africa	1,500,000	1,268,585	460,000	276,708
Rampura Agucha Mines India	1,000,000	1,212,658	-	-
Metso Outotec South Africa South Africa	28,000,000	467,063	28,000,000	7,370,454
A9 Systems LLC Russia	500,000	8,394	500,000	1,145,803
ERG Management South Africa South Africa	215,000	-	900,000	873,723

Mintek assesses credit worthiness of debtors based on several factors which includes payment history, credit risk, financial status, etc. Credit risk is managed through advance billing arrangements, where required, where customers are billed in advance which might exceed the assigned credit limit but with limited credit risk.

The maximum credit and interest risk exposure in respect of the relevant financial instruments is as follows:

	2023 R	2022 R
Long-term Investments	100	100
Receivables from Exchange Transactions	70,488,480	51,699,517
Bank, Cash and Cash Equivalents	507,735,631	461,751,988
Maximum Credit Risk Exposure	578,224,211	513,451,605

The major concentrations of credit risk that arise from Mintek's receivables in relation to customer classification are as follows:

Exchange Debtors:	%	%
- Trade Debtors	31.43%	47.08%
- Government Debtors	6.70%	3.50%
- Project Work-in-Progress	34.94%	35.74%
- Staff Debtors	5.69%	4.41%
- Other Debtors	21.24%	9.27%
Total Credit Risk	100.00%	100.00%

32. FINANCIAL INSTRUMENTS (Continued)

	2023 R	2022 R
Bank and Cash Balances		
ABSA Bank Ltd	91,087,900	133,941,941
First National Bank	97,820,649	73,397,618
Nedbank	108,233,901	102,235,742
Investec	104,631,265	80,652,036
Stanlib	105,931,451	71,502,941
Other	30,465	21,710
Total Bank and Cash Balances	507,735,631	461,751,988

Credit quality of Financial Assets:

The credit quality of financial assets that are neither past due nor impaired can be assessed by reference to external credit ratings (if available) or to historical information about counterparty default rates. Mintek receivables from exchange transactions are of a high quality where it is anticipated that the payments will be received on time.

Receivables from Exchange Transactions

Counterparties without external credit rating:-

High	59,002,496	32,073,311
Total Receivables from Exchange Transactions	59,002,496	32,073,311

Credit Quality Groupings:

High - High certainty of timely payment. Liquidity factors are strong and the risk of non-payment is small.

Medium - Reasonable certainty of timely payment. Liquidity factors are sound, although ongoing funding needs may enlarge financing requirement. The risk of non-payment is small.

Low - Satisfactory liquidity factors and other factors which qualify the Entity as investment grade. However, the risk factors of non-payment are larger.

None of the financial assets that are fully performing, have been renegotiated in the last year.

32. FINANCIAL INSTRUMENTS (Continued)**32.9 Liquidity Risk Management**

Ultimate responsibility for liquidity risk management rests with the Board, which has built an appropriate liquidity risk management framework for the management of the Entity's short, medium and long-term funding and liquidity management requirements. The Entity manages liquidity risk by maintaining adequate reserves, banking facilities, by continuously monitoring forecast and actual cash flows and matching the maturity profiles of financial assets and liabilities.

Liquidity Risk Tables

The Entity ensures that it has sufficient cash on demand or access to facilities to meet expected operational expenses through the use of cash flow forecasts.

The following tables detail the Entity's remaining contractual maturity for its non-derivative financial liabilities. The tables have been drawn up based on the undiscounted cash flows of financial liabilities based on the earliest date on which the Entity can be required to pay.

Description	Average effective Interest Rate	Total	6 Months or less	6 -12 Months	1-2 Years	2-5 Years	More than 6 Months
		R	R	R	R	R	R
31 March 2023							
Non-interest Bearing		309,259,509	309,259,509	-	-	-	-
Fixed Interest Rate Instruments		39,515,043	39,515,043	-	-	-	-
		348,774,552	347,191,132	-	-	-	-
31 March 2022							
Non-interest Bearing		292,994,954	292,994,954	-	-	-	-
Fixed Interest Rate Instruments		39,515,043	39,515,043	-	-	-	-
		332,509,997	332,509,997	-	-	-	-

The following table details the Entity's expected maturity for its non-derivative financial assets. The tables below have been drawn up based on the undiscounted contractual maturities of the financial assets including interest that will be earned on those assets except where the Entity anticipates that the cash flow will occur in a different period.

Description	Average effective Interest Rate	Total	6 Months or less	6-12 Months	1-2 Years	2-5 Years	More than 6 Months
		R	R	R	R	R	R
31 March 2023							
Non-interest Bearing	0.00%	54,449,702	54,449,702	-	-	-	-
Variable Interest Rate Instruments	4.35%	43,905,231	43,905,231	-	-	-	-
Fixed Interest Rate Instruments	0.00%	463,800,035	463,800,035	-	-	-	-
		562,154,969	562,154,969	-	-	-	-
31 March 2022							
Non-interest Bearing	0.00%	46,292,453	46,292,453	-	-	-	-
Variable Interest Rate Instruments	2.96%	75,087,518	75,087,518	-	-	-	-
Fixed Interest Rate Instruments	0.00%	386,642,860	386,642,860	-	-	-	-
		508,022,831	508,022,831	-	-	-	-

The Entity does not have any financing facilities. The Entity expects to meet its obligations from operating cash flows and proceeds of maturing financial assets and to maintain current debt to equity ratio.

32. FINANCIAL INSTRUMENTS (Continued)**32.10 Other Price Risks**

The Entity is not exposed to equity price risks arising from equity investments as the Entity does not trade these investments.

33. RELATED PARTY TRANSACTIONS

Related party transactions exist within the Group. These transactions were all concluded at arm's length and therefore disclosed here only for information purposes. Details of material transactions with related parties not disclosed elsewhere in the financial statements are as follows:

33.1 Interest of Related Parties**Entities with whom the Entity has a relationship:**

Controlling Entity:	Department of Mineral Resources and Energy (DMRE)
Subsidiary:	Mindev (Pty) Ltd
Subsidiary of Mindev (Pty) Ltd:	PhilisaSechaba Healthcare (Pty) Ltd (Previously Ketlaphela Medical Diagnostics (Pty) Ltd)
National Government	All National Government Entities

Board Members / Management with whom the Entity has a relationship:

The following Board Members and/or management of the Entity was active during the period under review:

Name of Related Person	Designation	Board Term
Ramontja T Dr	Chairperson	30 August 2022 - 29 August 2025
Zikalala-Mvelase NP	Deputy Chairperson	1 June 2020 - 31 May 2023
NF Ngobeni	Non-Executive Board Member	1 June 2020 - 31 May 2023
Ngcwabe NF	Non-Executive Board Member	1 June 2020 - 31 May 2023
Ngobeni MW Dr	Non-Executive Board Member	1 June 2020 - 31 May 2023
Heydenrich R	Non-Executive Board Member	1 June 2020 - 31 May 2023
Maruping P	Non-Executive Board Member	1 June 2020 - 31 May 2023
Motaung H	Non-Executive Board Member	1 June 2020 - 31 May 2023
Phiri MM	Non-Executive Board Member	1 June 2020 - 31 May 2023
Makibinyane LL	Non-Executive Board Member	1 June 2020 - 31 May 2023
Moatshe RA	Non-Executive Board Member (Alternate)	Initial Term 1 June 2016- 31 August 2019, Extension from 1 June 2020 to 31 May 2023
Ngubevana L Prof	Non-Executive Board Member	30 August 2022 - 29 August 2025
Motuku Dr M	Chief Executive Officer	
Simelane SA	Chief Financial Officer	
Govender Prof I	General Executive: Mineral Processing and Characterisation	
Gericke M	General Executive: Extractive Metallurgy	
Papo Dr MJ	General Executive: Mining, Material and Automation	

33. RELATED PARTY TRANSACTIONS (Continued)**32.2 Transactions with Related Parties****32.2.1 Income Received from Related Parties:**

During the year funds were received and revenue recognised from the following Related Parties that are related to the Entity as indicated below. The balances at year-end contained in deferred income and debtors is disclosed.

	Funds Received	Revenue	Deferred Income	Outstanding Balance
	R	R	R	R
For the Year ended 31 March 2023				
Department of Mineral Resources and Energy - State Grant	282,569,565	282,569,565	-	-
Department of Mineral Resources and Energy - MTEF	-	13,756,417	20,158,299	-
Department of Mineral Resources and Energy - Asbestos	106,871,304	122,480,417	119,261,754	-
Department of Mineral Resources and Energy - Other	-	477,826	-	549,500
Department of Science and Innovation	54,829,499	49,503,531	39,317,731	2,033,441
National Research Fund	2,309,700	1,455,081	896,827	-
Mining Qualification Authority	5,085,856	2,717,933	6,410,038	-
CSIR	40,508	37,485	-	43,108
Water Research Council	456,000	396,522	-	-
Technology Innovation Agency	1,049,010	2,575,737	-	2,094,212
Total	453,211,442	475,970,513	186,044,649	4,720,260
For the Year ended 31 March 2022				
Department of Mineral Resources and Energy - State Grant	260,677,391	260,677,391	-	-
Department of Mineral Resources and Energy - MTEF	14,320,000	8,501,117	33,914,715	-
Department of Mineral Resources and Energy - Asbestos	106,348,696	101,534,624	130,269,168	-
Department of Science and Innovation	49,754,738	64,185,709	31,673,222	87,460
National Research Fund	2,392,174	1,660,477	229,706	189,882
Mining Qualification Authority	5,670,413	4,255,363	5,691,539	1,309,836
Council for GeoScience	8,223	7,150	-	-
CSIR	28,255	54,724	-	40,508
Water Research Council	300,000	260,870	-	-
Technology Innovation Agency	825,126	885,436	-	181,125
Total	440,325,016	442,022,860	201,776,349	1,808,811

Prior year figures for Department of Mineral Resources and Energy - Asbestos have been restated. Refer to correction of Error for impact.

33. RELATED PARTY TRANSACTIONS (Continued)**33.2.2 Services rendered to Related Parties:**

Apart from the revenue as disclosed above no further services were rendered to related parties. All transactions were concluded on an arm's length basis.

33.2.3 Services rendered by Related Parties:

The below is a summary of transactions with related parties during the year and balances due at year-end. Amounts due to these entities are subject to the same terms and conditions as normal trade payables.

	Expenditure	Outstanding Balance
	R	R
For the Year ended 31 March 2022		
Major Public Entities	3,469	-
National Public Entities	330,932	33,356
National Government Business Enterprises	533,578	-
For the Year ended 31 March 2023		
Major Public Entities	63,318	7,253
National Public Entities	365,527	54,000
National Government Business Enterprises	634,048	-

33.3 Loans granted to/(from) Related Parties

The Entity does not grant loans to its Board Members. Advances, together with the conditions thereof, granted to Management, Staff and Public are disclosed in Note 2. to the Annual Financial Statements.

As disclosed in Note 6., an amount of R39,515,043 (2022: R39,515,043) is due to Mindev (Pty) Ltd. This loan relates to income received on the sale of technologies in Mindev. The funds were deposited into Mintek's bank account as Mindev does not have a bank account. These monies are held on Mindev's behalf. Mintek provides administrative support to all subsidiaries in their dormant status which includes preparation of subsidiary financial statements, audit, filing of statutory returns, company secretariat functions, etc. This support is at no cost in lieu of the interest free loan. There are no fixed terms of repayment and it is interest free.

33. RELATED PARTY TRANSACTIONS (Continued)**33.4 Board Members and Executive Management Remuneration****Board Member Payments:**

2023	Director's Fees R	Expenses R	Total R
Ramontja T Dr	42,494	-	42,494
Ngobeni MW Dr	71,154	-	71,154
Ngubevana Prof L	38,442	-	38,442
Heydenrich R	78,600	-	78,600
Maruping P	78,600	-	78,600
Motaung H	89,546	-	89,546
Zikalala-Mvelase NP	164,631	-	164,631
Phiri MM	128,665	-	128,665
Makibinyane LL	120,182	-	120,182
Thomani AM*	49,838	-	49,838
Mokupo P*	67,265	-	67,265
	929,417	-	929,417

2022	Director's Fees R	Expenses R	Total R
Mkosana Dr VM	26,150	-	26,150
Ngobeni MW Dr	88,251	-	88,251
Zungu Prof L	19,002	-	19,002
Heydenrich R	114,102	-	114,102
Maruping P	89,004	-	89,004
Motaung H	126,851	-	126,851
Zikalala-Mvelase NP	216,781	-	216,781
Phiri MM	122,192	-	122,192
Makibinyane LL	124,778	-	124,778
Thomani AM*	46,169	-	46,169
Mokupo P*	46,169	-	46,169
	1,019,449	-	1,019,449

Ms NF Ngcwabe and Mr RA Moatshe were not paid any directors' emoluments as they are serving as government employees.

*Relates to independent committee member.

33. RELATED PARTY TRANSACTIONS (Continued)**Executive Management Remuneration**

2023		Annual Remuneration R	Performance Bonus and other Expenses R	Total R
Dr M Motuku	Chief Executive Officer	4,152,011	335,110	4,487,121
SA Simelane	Chief Financial Officer	2,773,902	223,882	2,997,785
Dr MJ Papo	Group Executive: Mining, Material and Automation	2,288,631	184,716	2,473,346
Prof I Govender	Group Executive: Mineral Processing and Characterisation	2,244,139	150,359	2,394,498
M Gericke	Group Executive: Extractive Metallurgy	2,257,045	182,167	2,439,212
		13,715,728	1,076,233	14,791,961

2022		Annual Remuneration R	Performance Bonus and other Expenses R	Total R
Dr M Motuku	Chief Executive Officer	3,953,324	-	3,953,324
SA Simelane	Chief Financial Officer	2,641,162	-	2,641,162
+ Dr MJ Papo	Group Executive: Mining, Material and Automation	1,846,713	89,945	1,936,657
- Prof I Govender	Group Executive: Mineral Processing and Characterisation	1,786,750	-	1,786,750
+ M Gericke	Group Executive: Extractive Metallurgy	1,821,247	92,113	1,913,360
* AD McKenzie	General Manager: Technology	590,742	215,121	805,863
		12,639,938	397,179	13,037,117

+ Appointed 1 March 2022

- Appointed 1 June 2021

* Resigned 30 June 2021

+ Dr Papo and Ms Gericke was Executive Managers at Mintek before they were appointed as Group Executives from 1 March 2022. The amount as disclosed represents their salaries for the period 1 April 2021 to 31 March 2022.

33. RELATED PARTY TRANSACTIONS (Continued)

	2023	2022
	R	R

33.5 Controlled Entities

The Group comprises of Mintek and its wholly owned subsidiary Mindev (Proprietary) Limited which 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.

Ketlaphela Medical Diagnostics (Pty) Ltd was registered, under Mindev (Pty) Ltd, during 2020/2021 with the intention to commercialise the medical diagnostic products that Minlek is currently developing. The company name was changed to PhilisaSechaba Healthcare (Pty) Ltd in 2021/2022. Mindev holds 100% shares in PhilisaSechaba.

Details of the investment in Mindev (Pty) Ltd is disclosed in Note 6.

34. CONTINGENT LIABILITIES**34.1 Guarantees:**

	5,041,973	4,698,413
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(i) Rand Merchant Bank:

	5,041,973	4,698,413
--	-----------	-----------

Cessions in favour of Rand Merchant Bank to meet requirements for performance guarantee facilities that have been registered.

34.2 Court Proceedings:

	344,000	419,000
--	---------	---------

(i) Dispute on Employment Contracts:

	344,000	419,000
--	---------	---------

The Entity has disputed employment contracts with former employees, the aggregate of which is not expected to exceed the amount indicated. This amount includes estimated legal costs and disbursements and does not factor the success rate of the individual cases. The outcome of the cases is still uncertain.

35. TAXATION

	2023	2022
--	------	------

Reconciliation between applicable tax rate and average effective tax rate:

	27.00%	28.00%
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Applicable tax rate

	0.00%	0.00%
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Average Effective Tax Rate

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

36. EVENTS AFTER THE REPORTING DATE

No events having financial implications requiring disclosure occurred subsequent to 31 March 2023.

37. COMPARATIVE FIGURES

The comparative figures were restated as a result of the effect of Prior Period Errors (Note 26.)

38. SEGMENT REPORTING

The accounting policies of the segments are the same as those described in the summary of significant accounting policies.

For management purposes Mintek is broadly organised into business units based on the nature of operations and the services they provide. Mintek has three primary reportable segments.

No individually material operating segments have been aggregated to form the above reportable operating segments. Mintek does not monitor segments geographically.

Mintek Management monitors the operating results of its business units separately for the purpose of making decisions about resource allocation and performance assessment. Segment performance is evaluated based on non-financial metrics and the segment's operating surplus or deficit, measured consistently with the accounting policies applied in the Annual Financial Statements. However, the financing (including finance costs and finance income) and other revenue are managed on a group basis and are not allocated to operating segments.

Inter-business unit services are not valued and are deemed to have been supplied for no consideration, and are therefore not eliminated. However, the quality of services provided internally is monitored as part of the non-financial service performance information.

The segmental information for Financial Performance of Mintek is disclosed in the table below. It is not practical to segmentise Financial Position and Cash Flow operations.

Description	2023				
	Extractive Metallurgy	Mineral Processing & Characterisation	Mining, Materials & Automation	Corporate Services	MINTEK
	R	R	R	R	R
REVENUE	106,781,533	64,884,541	251,859,175	225,979,399	649,504,648
Revenue from non-exchange	32,115,308	34,903,942	39,770,994	189,535,737	296,325,981
Revenue from Exchange	61,957,980	56,248,943	217,461,631	(12,260,660)	323,407,894
Other Revenue	12,708,245	(26,268,344)	(5,373,450)	48,704,322	29,770,773
EXPENDITURE	94,039,873	79,150,743	217,432,641	254,001,156	644,624,413
Compensation of Employees	67,005,903	52,299,609	82,029,914	110,727,701	312,063,127
Other Operating Expenditure	20,397,214	16,361,078	130,799,437	125,759,137	293,316,866
Depreciation	6,636,756	10,490,056	4,603,290	17,514,318	39,244,420
Net Surplus/(deficit)	12,741,660	(14,266,202)	34,426,534	(28,021,757)	4,880,235

38. SEGMENT REPORTING (Continued)

Description	2022				
	Extractive Metallurgy	Mineral Processing & Characterisation	Mining, Materials & Automation	Corporate Services	MINTEK
	R	R	R	R	R
REVENUE	101,398,710	66,046,713	231,528,165	211,719,634	610,693,222
Revenue from non-exchange	38,907,013	27,572,167	18,894,321	183,805,008	269,178,509
Revenue from Exchange	62,491,697	38,469,842	212,614,936	8,264,537	321,841,012
Other Revenue	-	4,704	18,908	19,650,089	19,673,701
EXPENDITURE	96,272,182	84,393,601	194,728,322	215,661,703	591,055,808
Compensation of Employees	65,548,155	51,564,048	76,675,840	119,086,144	312,874,187
Other Operating Expenditure	22,010,856	16,517,769	105,583,805	101,804,358	245,916,788
Depreciation	8,713,171	16,311,784	12,468,677	(5,228,800)	32,264,832
Net Surplus/(deficit)	5,126,528	(18,346,888)	36,799,843	(3,942,069)	19,637,414

The revenue from Exchange amounts for 2022 was restated due to prior year corrections.

39. GOING CONCERN ASSESSMENT

Management considered the following matters relating to the Going Concern:

- In terms of the Shareholder's Compact, Mintek is estimating a surplus of R2,195,000 for the following financial year (2022/23: R2,439,000) and a positive cashflow forecast. This budget was approved by the Executive Authority in February 2023. The approved budget supports the Generally Recognised Accounting Practices (GRAP) accounting framework for the compilation of the Annual Financial Statements. The gradual recovery of the global economy have presented several opportunities as evidenced through increased revenues generated in the 2023 financial year. The increased revenues is however accompanied by increased costs. The budget as compiled for the 2023/2024 financial year does support the ongoing execution of the Mintek mandate.
- Strict cost management processes are embedded in the Entity's operations to manage and monitor all income and expenditure supporting the Budget. The monitoring processes is complemented by monthly and quarterly reporting, highlighting the actual financial position, including the associated risks and remedial actions to be instituted.

Taking the aforementioned into account, management has prepared the Annual Financial Statements on the Going Concern Basis.

Mindev (Pty) Ltd Annual Financial Statements

Mindev (Pty) Ltd (Registration number 2001/018449/07)

General Information

Country of incorporation and domicile	South Africa		
Directors	SA Simelane		
Registered office	200 Malibongwe Drive Randburg 2194		
Business address	200 Malibongwe Drive Randburg 2194	Postal address	Private Bag X3015 Randburg 2125
Holding company	Mintek (100% owned) incorporated in South Africa		

INDEX

The reports and statements set out below comprise the financial statements presented to the shareholders:

	Page
Statement of Financial Position	167
Statement of Changes in Equity	167
Accounting Policies	167
Notes to the Financial Statements	168

A report of the directors has not been prepared as the company is a wholly owned subsidiary of Mintek which is incorporated in South Africa.

The financial statements set out on pages 3 to 6, which have been prepared on the going concern basis, were approved by the board of directors on 28 July 2023 and were signed on its behalf by:



SA Simelane

Mindev (Pty) Ltd Statement of Financial Position as at 31 March 2023

Figures in Rand	Note(s)	2023	2022
Assets			
Non-Current Assets			
Non-Current Investments	2	100	100
Loans to shareholders	3	39,514,843	39,514,843
Total Assets		39,514,843	39,514,943
Equity and Liabilities			
Equity			
Share capital	4	100	100
Retained income		39,514,843	39,514,843
Total Equity		39,514,843	39,514,843

Mindev (Pty) Ltd Statement of Statement of Changes in Equity

Figures in Rand	Share capital	Retained income	Total equity
Balance at 01 April 2021	100	39,514,843	39,514,943
Balance at 01 April 2022	100	39,514,843	39,514,943
Balance at 31 March 2023	100	39,514,843	39,514,943

Mindev (Pty) Ltd Accounting policies

1. Significant accounting policies

The principal accounting policies applied in the preparation of these financial statements are set out below.

1.1 Financial instruments

These financial assets are classified as loans and receivables.

1.2 Investment in Controlled Entities

Investments in controlled entities are consolidated in Mindev annual financial statements.

In Mindev's separate annual financial statements, investments in controlled entities are carried at cost. The entity applies the same accounting for each category of investment.

Investments in controlled entities that are accounted for in accordance with the accounting policy on Financial Instruments in the consolidated annual financial statements, are accounted for in the same way in Mindev's separate annual financial statements.

Mindev (Pty) Ltd Accounting policies

1.3 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.

1.4 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.

Ordinary shares are recognised at par value and classified as 'share capital' in equity. Any amounts received from the issue of shares in excess of par value is classified as 'share premium' in equity. Dividends are recognised as a liability in the company in which they are declared.

Mindev (Pty) Ltd Notes to the Financial Statements

Figures in Rand

	2023	2022
2. Non-Current Investments		
Unlisted		
Investment in Controlled Entities		
PhilisaSechaba Healthcare (Pty) Ltd	100	100
The Entity exercises control over the above company which was incorporated during the financial year.		
Issued Share Capital (R)	100	100
Percentage controlled by Board (%)	100.00%	100.00%
Ketlaphela Medical Diagnostics (Pty) Ltd changed its name to PhilisaSechaba Healthcare (Pty) Ltd during the 2021/2022 financial year.		

Mindev (Pty) Ltd Notes to the Financial Statements (Continued)

Figures in Rand

	2023	2022
3. Loan to shareholder		
Mintek		
The loan is interest free and has no repayment terms.	39,514,843	39,514,843
Split between non-current and current portions		
Non-current assets	39,514,843	39,514,843
Current assets	-	-
	39,514,843	39,514,843
4. Share capital		
Authorised		
1,000 Ordinary shares of R1 each	1,000	1,000
Issued		
100 Ordinary shares of R1 each	100	100
5. Related parties		
The Group comprises of Mintek and its wholly owned subsidiary Mindev (Proprietary) Limited and PhilisaSechaba Healthcare (Proprietary) Limited, a wholly owned subsidiary of Mindev. Mindev is engaged in the commercialisation of Mintek patents and technology through the identification of suitable partners. PhilisaSechaba Healthcare has been incorporated to facilitate the marketing, sale and distribution of the medical related products that Mintek will be producing. The Group, in the ordinary course of business, enters into various sale and purchase transactions with related parties.		
Ketlaphela Medical Diagnostics (Pty) Ltd changed its name to PhilisaSechaba Healthcare (Pty) Ltd during the 2021/2022 financial year.		
None of the directors, officers or the shareholder 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.		
Relationships		
Holding company	Mintek	
Subsidiary	PhilisaSechaba Healthcare (Pty) Ltd	
Related party balances		
Loan accounts - Owing by related parties	6	
Mintek	39,514,843	39,514,843
6. Directors' emoluments		
No emoluments were paid to the directors or any individuals holding a prescribed office during the year.		



11

Mintek Research Outputs

Introduction	172
Journal Articles	172
Conference Papers	176
Book Chapters	179

A bottom view of a spiral concentrator used in mineral processing.



Left: Samples are being prepared for heap leaching in the Biometallurgy Division.

Right: Geochemical analysis of powder samples using benchtop ED-XRF.



11 | Introduction

This section provides contributions made by Mintek in the field of research during the financial year 2022-23. It provides a detailed collection of research journal articles, conference papers, and book chapters authored by Mintek's researchers, highlighting their valuable insights, discoveries, and advancements in various domains. With a strong commitment to driving innovation and pushing the boundaries of knowledge, Mintek's research outputs demonstrate the organisation's dedication to fostering scientific excellence and making a lasting impact in the minerals industry.

11.1 | Journal Articles

- Abongile Jijana, Abera Demeke Ambaye, Munkombwe Muchindu, Shivani Mishra and Edward Nxumalo.** Screen-printed electrode system based on carbon black carbon copper organic framework for electrochemical detection of nitrite. *Materials Today Communications*, 2023, Vol. 35.
- Abongile Jijana, Maboya W.K., Mawubane-Nkadimeng M.S., Jijana A.N. and Mmako H.K.** Nitrogen inclusion in carbon nanotubes initiated by boron doping and chlorination: Their use as electrocatalysts for oxygen reduction reaction. *Frontiers*, Vol. 9, 2022.

- Abongile Jijana, Usisipho Feleni, Peter M. Ndangili, Mawethu Bilibana, Rachel F. Ajayia and Emmanuel I. Iwuoha.** Quantum Dot-Sensitised Estrogen Receptor- α -Based Biosensor. *Biosensors*, Vol. 13, No. 2, 2023.
- Abongile Jijana.** Polyaniline Entrapped Water Dispersible 3MPA ZnSe Quantum Dots and Their Application for the Development of an Enzymatic Electrochemical Nanobiosensor for the Detection of 17β Estradiol, an Endocrine Disrupting Compound. *Applied Biochemistry and Biotechnology*, Vol. 195, No. 5, 2023.
- Agnes Modiga, Hamza Harrar, Orevaoghene Eterigho-Ikelegbe and Samson Bada.** Mineralogy and distribution of rare earth elements in the Waterberg coalfield high ash coals. *Minerals Engineering*. Vol. 183, No. 15, June 2022.
- Andile Mkhohlakali, Xolile Fuku, Min Ho Seo, Mmalewane Modibedi, Lindiwe Khotseng and Mkhulu Mathe.** Electro-Design of Bimetallic PdTe Electrocatalyst for Ethanol Oxidation: Combined Experimental Approach and Ab Initio Density Functional Theory (DFT)-Based Study. *Nanomaterials*. Vol. 12, No. 20, October 2022.
- Andile Mkhohlakali, Xolile Fuku, Mmalewane Modibedi, Lindiwe Khotseng, and Mkhulu Mathe.** Electrodeposition of Ternary BiTePd Nanofilm Electrocatalyst Using Surface-Limited Reaction for Direct Ethanol Fuel Cell. *Journal of the Electrochemical Society*, Vol. 169, No. 4, April 2022.
- Bambesive May, Kedibone Mashale, Mokae Bambo, Olayemi J. Fakayode, Ajay K. Mishra and Edward N. Nxumalo.** Detection and separation of silver ions from

industrial wastewaters using fluorescent D-glucose carbon nanosheets and quaternary silver indium zinc sulphide quantum dots. *Journal of Water Process Engineering*, Vol. 49, October 2022.

- Candice Carelse, Marian Manuel, Dshentthree Chetty, Mehdi Safari, Kirsten Youlton.** The flotation behaviour of liberated Platinum Group Minerals in Platreef ore under reduced reagent conditions. *Minerals Engineering*. Vol. 190, December 2022.
- Dshentthree Chetty, Pillay, K., Mainza, A.N. and Becker, M.** Mineralogical factors affecting the dense medium separation of nickel sulfide ores. *Minerals*, Vol. 12, No. 10, October 2022.
- Elias Matinde, Brian Mwewa, Margreth Tadie, Sehliselo Ndlovu and Geoffrey S. Simate.** Recovery of rare earth elements from acid mine drainage: A review of the extraction methods. *Journal of Environmental Chemical Engineering*, Vol. 10, No. 3, June 2022.
- Elias Matinde, Thandiwe Fungene and Sehliselo Ndlovu.** Scale formation in wet scrubbers and the current state of anti-scaling and softening methods for hard waters: A review. *Separation Science and Technology*, Vol. 58, No. 7, March 2023
- Getrude Marape, Dr Victor Ross, Mpho Ramonotsi.** A study on the recovery of fine chromite from UG2 tailings paper. *Minerals Engineering*, Vol. 187, September 2022..
- Hendriette Van der Walt, Maela MP and Serepa-Dlamini MH.** The Antibacterial, Antitumor Activities, and

Bioactive Constituents' Identification of *Alectra sessiliflora* Bacterial Endophytes. *Frontiers in Microbiology*, Vol. 13, 2022.

- James Tshilongo.** Fabrication of AgCu/TiO₂ nanoparticle based. *Materials Advances*, Vol. 3, No. 19, July 2022.
- Fabrication of AgCu/TiO₂ nanoparticle based. Materials Advances, Vol. 3, No. 19, July 2022.** Study of Rolling Contact Fatigue, Rolling and Sliding Wear of Class B Wheel. *Tribology International*, Vol. 174, October 2022
- Keneiloe Sikhwivhilu, Fhulufhelo Tshililo, Shingirirai Mutanga, John Siame, Charles Hongoro, Lavhelesani R. Managa, Charles Mbohwa and Daniel M. Madyira.** Analysis of the determinants of household's water access and payments among the urban poor. A case study of Diepsloot Township. *Physics and Chemistry of the Earth*, Vol. 127, No. 3, June 2022.
- Kerri Du Preez, Tamsyn Grewar, Bongolwethu Mabusela and Dheepak Maharajh.** Production of nesquehonite, a magnesia precursor, by carbonation of synthetic mine waste water. *Int. J. Environment and Waste Management*, Vol. 29, No. 4, July 2022.
- Kgomotso Maluleke, Xolisa Goso, Elias Matinde and Prof Sehliselo Ndlovu.** Investigations into the extraction of rare earth elements from Zandkopsdrift ore using the sulfation roasting process. *Minerals Engineering*. Vol. 191, January 2023.

- 20. Maje Phasha, Marandela Mulaudzi and Hein Moller.** Design of cubic ni-based alloys for use as coating in petrochemical industry – A first principles approach. South African Journal of Industrial Engineering, Vol. 33, No. 3, November 2022.
- 21. Mbavhalelo Maumela, Zvinvashe K, Chikosha S and Madyira D.** The Effect of Cold Rolling Parameters on the Densification of Titanium Sintered Strips. Key Engineering Materials, Vol. 938, December 2022..
- 22. Mbuso Mlambo, A. Bele, M.R. Mhlongo, L.F. Koao, T.E. Motaung, T.D. Malevu, T.T. Hlatshwayo, S. Mpelane and S.V. Motloung.** Effects of varying Sm³ concentration on the structure, morphology and photoluminescence properties of the BaAl₂O₄-CaAl₂O₄-Ca₄Al₆O₁₃-Ca₃Al₂O₆: Sm³⁺ mixed phases using citrate sol-gel method. Heliyon, Vol. 8, No. 12, December 2022.
- 23. Mbuso Mlambo, Phumlane Mdluli, Nicole Sibuyi, Zikhona Njengele, Shumbula NP, Ndala ZB, Nkabinde SS, Nchoe O, Macumele K, Mpelane S, Shumbula MP and Moloto N.** Antimicrobial activity and cytotoxicity of copper/ polydopamine nanocomposites. Results in Chemistry, Vol. 4, January 2022.
- 24. Mbuso Mlambo, Phumlane Mdluli, SF. Muthwa, NS. Zulu, M Kistan, SC Onwubu, NP. Shumbula, N Moloto, S Mpelane and T Hlatshwayo.** Unravelling mechanism for detecting chromium on functionalised gold nanoparticles via a smartphone and spectrophotometric-based systems supported by CIEL*a*b* colour space and molecular dynamics. Journal of Molecular Structure, Vol. 1274, No. 10, February 2023.
- 25. Mehdi Safari, F.S.Hoseinian, D.Deglon, L.Leal Filho and T.C.Souza Pinto.** Impact of flotation operational parameters on the optimisation of fine and coarse. Powder Technology, Vol. 408, August 2022.
- 26. Mehdi Safari.** Introducing key advantages of intensified flotation cells over conventionally used mechanical and column cells. Physicochemical Problems of Mineral Processing, Vol. 58, No. 5, 2022.
- 27. Michael Odidi, Marijke A Fagan-Endres and Susan T.L. Harrison.** Moisture absorption rates via capillary suction within packed beds - The effect of material and fluid properties with implications for heap leaching operations. Hydrometallurgy, Vol. 215, January 2023.
- 28. Michael Odidi, Marijke A. Fagan-Endres and Susan T. L. Harrison.** Residence Time Distribution Analysis of Drip-Irrigated Beds: The Effect of Material and Fluid Properties with Implications for Heap Leaching Practice. Minerals, Vol. 13, No. 2, February 2023.
- 29. Mokae Bambo, Bambesiwe May, Unathi Sidwaba, Edward N Nxumalo, Jay K. Mishra and Seyed Saaid Hosseini.** A review on I-III-VI ternary quantum dots for fluorescence detection of heavy metals ions in water: optical properties, synthesis and application. RSC Advances, Vol 12, No.18, 2022.
- 30. Mopeli Khama and Quinn Reynolds.** CFD Modelling of Gas-Solid Reactions Analysis of Iron and Manganese Oxides Reduction with Hydrogen. Mathematical and Computational Applications, Vol. 28, No. 2, March 2023.
- 31. Nicole Sibuyi, Aboyewa JA, Goboza M, Murtz L, Oguntibeju OO and Meyer M.** Co-Treatment of Caco-2 Cells with Doxorubicin and Gold Nanoparticles Produced from Cyclopia intermedia Extracts or Mangiferin Enhances Drug Effects. Nanomaterials, Vol.12, No. 21, November 2022.
- 32. Nicole Sibuyi, Abram M Madiehe, Koena L Moabelo, Keletso Modise, Samantha Meyer, Admire Dube, Martin O Onani and Mervin Meyer.** Catalytic Reduction of 4 Nitrophenol and Methylene Blue by Biogenic Gold Nanoparticles Synthesised using Carpobrotus Edulis Fruit (Sour Fig) Extract. Nanomaterials and Nanotechnology, Vol. 12, August 2022.
- 33. Nicole Sibuyi, Adewale Oluwaseun Fadaka, Odunayo Anthonia Taiwo c,d, Oluwatosin Adebisi Dosumu, Oluwafemi Paul Owolabi, Adebola Busola Ojo, Samee Ullah, Ashwil Klein, Abram Madimabe Madiehe, Mervin Meyer and Oluwafemi Adeleke Ojo.** Computational Prediction of Potential Drug Like Compounds Sativa Leaf Extracts Targeted Towards Alzheimer Therapy. Journal of Molecular Liquids, Vol. 360, 2022.
- 34. Nicole Sibuyi, Jerry O. Adeyemi, Lukman O. Olasunkanmi, Adewale O. Fadaka, Adebola O. Oyedeji and Damian C. Onwudiwe.** Molecules. Vol. 27, No. 9, May 2022.
- 35. Nikiwe Mhlanga, Lucky Sikhwivhilu, Mr Magopa T.M Kekana, Prof Thuto E. Mosuang and Dr Mokete A. Mahladisa.** Classical molecular dynamics study of structural properties of pristine and defective mono-layer 2D h-BNNSs. Advances in Theoretical & Computational Physics, Vol. 5, No. 4, November 2022.
- 36. Nomsombuluko Hadebe, Joseph Moema, T. Sithuba, Lutendo C. Murulana, G. Masuku, Indra Bahadur and Mwadham M. Kabanda.** Corrosion Inhibitory Potential of Selected Flavonoid Derivatives: Electrochemical, Molecular Zn Surface Interactions and Quantum Chemical Approaches. Results in Engineering, Vol. 16, December 2022.
- 37. Nomsombuluko Masia, Melanie Smit, Alain Mwamba, K. Dyal Ukabhai, U. A. Curle, S. Norgren, C. O`hman-Ma`gi, N. G. Hashe and L. A. Cornish.** Formation of Ti₂Cu in Ti-Cu Alloys. Journal of Phase Equilibria and Diffusion, Vol. 43, June 2022.
- 38. Nomvuyo Nomadolo, Omotola Ester Dada, Andri Swanepoe land Sudhakar Muniyasamy.** A Comparative Study on the Aerobic Biodegradation of the Biopolymer Blends of Poly (butylene succinate), Poly (butyleneadipate terephthalate) and Poly(lactic acid). Polymers, Vol. 14, No. 9, May 2022.
- 39. Ntsoaki Mphuthi, Abongile Jijana, Lucky Sikhwivhilu, Phumlani Tetyana, Nosipho Moloto, Poslet Morgan Shumbula, Amanda Skepu, and Lea Sibulelo Vilakazi.** Synthesis, Characterization, and Electrochemical Evaluation of Copper Sulfide Nanoparticles and Their Application for Non-Enzymatic Glucose Detection in Blood Samples. Nanomaterials, Vol. 13, No. 3, 2023.
- 40. Ntsoaki Mphuthi, Lucky Sikhwivhilu and Suprakas Sinha Ray.** Functionalisation of 2D MoS₂ Nanosheets with Various Metal and Metal Oxide Nanostructures. Biosensors, Vol 12, No. 6, June 2022.
- 41. Palesa Seele, Busiswa Dyan, Charlotte Maserumule, Nicole Sibuyi and Skepu, Amanda.** Development of Gold-Nanoparticle-Based Lateral Flow Immunoassays for Rapid Detection of TB ESAT-6 and CFP-10. Biosensors, Vol. 13, No. 3, 2023.
- 42. Philemon Matabola, Odwa Mapazi, Teboho Mokhenaa and Hendriette Van der Walt.** The catalytic degradation of dyes using polyethersulfone poly vinylidene fluoride copper oxide composite nanofibers. Journal of Applied Polymer Science, Vol. 140, No. 13, 2023.
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- 45. Phumlane Mdluli, Sisonke Sigonya, Stanley Chibuzor Onwubu and Thabang Hendrica Mokhothu.** Method Optimisation and Application Based on Solid Phase Extraction of Non-Steroidal. SN Applied Sciences, Vol. 4, July 2022.
- 46. Quinn Reynolds, Markus Erwee and Johan.** The Effect of Oxygen Lancing into a Furnace Alloy Tap-Hole: A Computational Case Study for an Open-Bath Furnace. Zietsman, Vol. 75, October 2022.
- 47. Ramogohlo Diale, P.E. Ngoepe and H.R. Chauke.** Self-consistent charge density functional tight-binding (SCC-DFTB) parameterisation and validation for Ti₅₀Pd₅₀-XRuX alloys. Computational Materials Science, Vol. 218, 5 February 2023.
- 48. Reagan Mohlala and Mabel Coyanis.** The vital use of isocyanide-based multicomponent reactions (MCR) in chemical synthesis. Physical Sciences Reviews, February 2023
- 49. Reagan Mohlala, Bambesiwe May, Fakayode O.J. Mamba B.B and Nkambule T.T.I.** Optical properties of red/near infrared light-harvesting supramolecular porphyrin synthesised via electrochemical polymerisation of pyrrole – Effect of aging, Ca-metallation and H₂O₂ interaction. Optical Materials, Vol. 138, 2023.
- 50. Sam Moholwa, Joalet Dalene Steenkamp and Hillary Limo Rutto.** Dataset prepared for characterisation of three South African manganese ores before or after preheating in laboratory-scale rotary kiln. Data in Brief, Vol. 31, No. 45, August 2022.
- 51. Sam Moholwa, Joalet Steenkamp and Hillary Limo Rutto.** Method to determine the decrepitation index of South African manganese ores when heating in a rotary kiln. MethodsX, Vol. 9, 2022.
- 52. Sam Moholwa, Steenkamp JD and Rutto H.L.** Fines generation from South African manganese ores during preheating in a rotary kiln. Journal of the Southern African Institute of Mining and Metallurgy, Vol. 122, No. 11, January 2023.
- 53. Sanda Moloane, Joalet Steenkamp, Paul den Hoed and Nicola Wagner.** The effect of petrographically determined parameters on reductant reactivity in the production of high-carbon ferromanganese. The Journal of the Southern African Institute of Mining and Metallurgy, Vol.123, No.2, February 2023.
- 54. Sanele Nyembe, Gebhu Ndlovu, Lucky Sikhwivhilu, Francis Chindeka, Andile Mkhohlakali, and Tebello Nyokong.** Enhanced Solar Efficiency via Incorporation of Plasmonic Gold Nanostructures in a Titanium Oxide-Eosin Y Dye-Sensitized Solar Cell. Nanomaterials, Vol.12, No.10, May 2022.
- 55. Shani Bekker, Henk Huismans and Vida van Staden.** Generation of a Soluble African Horse Sickness Virus VP7 Protein Capable of Forming Core-like Particles. Viruses, Vol. 14, No. 8, July 2022.
- 56. Shani Bekker, Potgieter, C. A, van Staden, V.and Theron, T.** Investigating the Role of African Horse Sickness Virus VP7 Protein Crystalline Particles on Virus Replication and Release. Viruses, Vol. 14, No. 10, October 2022.
- 57. Sinazo Cobongela, Nicole Sibuyi, Phumlane Mdluli and Maya M. Makatini.** Acyldepsipeptide Analogues A Future Generation Antibiotics for Tuberculosis Treatment. Pharmaceuticals, Vol. 14, No. 9, September 2022.
- 58. Sonwabo Bambalaza, Buhle Xakalash, Xoliswa L. Dyosiba, Yolindi Coetsee, Pieter G. van Zyl, Nicholas M. Musyoka and Joalet D. Steenkamp.** Co-Carbonization of Discard Coal with Waste Polyethylene Terephthalate towards the Preparation of Metallurgical Coke. Materials, Vol. 16, No. 7, 2023.

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65. **Teboho Mokhena, Sisonke Sigonya, Thabang Hendrica Mokhothu and Talent Raymond Makhanya.** Mitigation of Non-Steroidal Anti-Inflammatory and Antiretroviral Drugs as Environmental Pollutants by Adsorption Using Nanomaterials as Viable Solution - A Critical Review. *Applied Sciences*, Vol. 13, No. 2, January 2023.

66. **Teboho Mokhena, T.E. Mokoena, M.J. Mochane, M.T. and Motloung, J.S. Sefadi.** The effect of boron nitride, carbon nanotubes, and their synergy on the properties of LLDPE and LLDPE wax blend. *Polymer Engineering & Science*, Vol. 62, No. 10, October 2022.

67. **Titus Nghipulile, Sandile Nkwanyana, Thomas Ehongo Moongo, Godfrey Dzinonwa, Benjamin Mapani and Jaquiline Tatenda Kurasha.** Evaluation of the relationship between milling kinetics parameters and mineralogical data: a case study of a multi-mineralised copper deposit. *Minerals*, Vol. 12, No. 10, October 2022.

68. **Zikhona Njengele, Nikiwe Mhlanga, Lucky Sikhwivhilu, Dr Thulaganyo Domfe, Dr Phumlani Tetyana, Dr Amanda Skepu, and Prof Jane Catherine Ngila.** Development of a Versatile Half-Strip Lateral Flow Assay toward the Detection of Rift Valley Fever Virus Antibodies. *Diagnostics*, Vol. 12, No. 11, 2022.

69. **Jestos Taguta, Zandile Peku, Nthapo Sehlotho and Kirsten Corin.** The Use of Acid Mine Drainage (AMD) in the Flotation of a Platinum-Group-Minerals-Bearing Merensky Ore. *Minerals*, Vol 12, 2022.

11.2 | Conference Papers

1. **Andile Mkhohlakali, Lebohang Hlatshwayo, Andile Mkhohlakalia, Xolile Fuku, Sanele Nyembe, Mmalewane Modibedic, Lindiwe. Khotseng, Lebohang Hlatshwayo and Mkhulu Mathe.** Electro-Design of Bimetallic PdTe Electrocatalyst for Ethanol Oxidation: Combined Experimental Approach and Ab Initio Density Functional Theory (DFT)-Based Study. 8th International Conference on Nanoscience and Nanotechnology in Africa (NanoAfrica 2022) will be a face-to-face conference, on the dates 26 – 28 October 2022.

2. **Bongani Ngobe, Ramogohlo Diale, Maje Phasha and MP Molepo.** The phase stability, mechanical and electronic properties of CsCl-type intermetallic: Ti50TM50 (TM = Ni, Ru and Pd), a first-principles approach. SA Institute of Physics, Proceedings of SAIP 2022, Division G: Theoretical and Computational Physics, 1-8 July 2022.

3. **Bongani Ngobe, Ramogohlo Diale, Maje Phasha, M.P Molepo and H.R Chauke.** Ab-initio Techniques, VASP and CASTEP are used to investigate the Electronic Properties of B2 Compounds formed between Ti and Group VIII Elements - a Comparative Study. The 23rd Annual International RAPDASA Conference joined by RobMech, PRASA and CoSAAMI November 9-11, 2022.

4. **Buhle Xakalashé, Elmar Muller, Xolisa Goso, Sello Tsebe and Elias Matinde.** Battery materials research conducted at Mintek towards energy storage and resource efficiency. Battery Materials Conference, 24-25 August 2022, Misty Hills, South Africa, SAIMM.

5. **Caroline Mphela, Maje Phasha, Joseph Moema and Josias van der Merwe.** Filler Materials used to Weld Ductile Cast Iron – A review. The 23rd Annual International RAPDASA Conference joined by RobMech, PRASA and CoSAAMI November 9-11, 2022.

6. **Elmar Muller and Roelf Sandenbergh.** A SA perspective of Battery Materials. Battery Materials Conference, 24-25 August 2022, Misty Hills, South Africa, SAIMM.

7. **Getrude Marape and Kagisego Shame.** Flotation processing of fine chrome from UG2 platinum operations in South Africa. IMPC Asia-Pacific 2022 22 - 24 August 2022 Melbourne, Australia.

8. **Hein Moller, Maje Phasha, Alain Mwamba and T Mathibeng.** Effect of Alloying on the Phase Stability and

Elastic Properties of Li2Pt3Cu Crystal Structure. SAIMM PGM 8th International Conference, November 2-3, 2022.

9. **Hein Moller, Maje Phasha, Alain Mwamba, Tiny Mathibeng.** Effect of Alloying on the Phase Stability and Elastic Properties of L12 Cu3Pt Crystal Structure. The 23rd Annual International RAPDASA Conference joined by RobMech, PRASA and CoSAAMI November 9-11, 2022.

10. **Hein Moller, V Motsweni, T Zrodowski and T Choma.** Powder Characterization of Pt84-Al11-Cr3-Ru2 Superalloy Manufactured by Ultrasonic Atomization. SAIMM PGM 8th International Conference, November 2-3, 2022.

11. **Indresan Govender and Taswald Moodley.** Evaluating rheological features inside tumbling mills using DEM data previously validated against PEPT measurements IMPC. Asia-Pacific 22 - 24 August 2022 Melbourne, Australia.

12. **Indresan Govender, M S Powell, A N Mainza, D K Weatherley and L M Tavares.** The irrefutable value of introducing a dynamic transport term into mill modelling. 2022 IMPC Asia-Pacific 22 - 24 August 2022 Melbourne, Australia.

13. **Joseph Moema, Muhammed Y. Salojee, Charles W. Siyasiya and Kofi A. Annan.** Electron Backscatter Diffraction Postprocessing Techniques for Studying Recrystallisation Phenomenon of Ferritic Stainless Steel. The 23rd Annual International RAPDASA Conference joined by RobMech, PRASA and CoSAAMI November 9-11, 2022.

14. **Joseph Moema, Seyed Reza Jafarpour Rezaei, Charles W. Siyasiya and Zheng-hua Tang.** The Influence of Final Coiling Temperature on the Microstructure and Mechanical Properties of High Ti-V HSLA Steels. The 23rd Annual International RAPDASA Conference joined by RobMech, PRASA and CoSAAMI November 9-11, 2022.

15. **Joseph Moema, T. Ramathe, C.W. Siyasiya and T. Buthelezi.** Corrosion Properties for Roll-Bonded Two-Layer AA4045/AA3003 for Heat Exchanger Application. The 23rd Annual International RAPDASA Conference joined by RobMech, PRASA and CoSAAMI November 9-11, 2022.

16. **Kedibone Mashale.** Gravimetric quantification of low-grade gold in mine tailings. Test & Measurement Conference 2022, 24–26 October 2022.

17. **Keneiloe Sikhwivhilu, Mmontshi Sikosana, Richard Moutloali and Daniel Madyira.** Application of Polyvinylidene fluoride Materials for Treatment of Municipal Wastewater Using UASB Reactor Technologies: A Review. 2022 IEEE 13th International Conference on Mechanical and Intelligent Manufacturing Technologies (ICMIMT), 2022.

18. **Lucky Sikhwivhilu, Gebhu Ndlovu, Sanele Nyembe, Poslet Shumbula and Nosipho Moloto.** Restriction of residual defects of Indium Phosphide Nanowires: Intergration into single nanowire electronic device and gas sensing. 8th International Conference on Nanoscience and Nanotechnology in Africa (NanoAfrica 2022) will be a face-to-face conference, on the dates 26 – 28 October 2022.

19. **Mapadi Olifant, Deshenthree Chetty and Bertus Smith.** Iron Ore Coarse Particle Characterisation-Towards Prediction of Particle Distribution in Gravity Separation Processing. 8th World Congress on Mechanical, Chemical, and Material Engineering (MCM'22) Prague, Czech Republic – 31 July, 2022 - 2 August, 2022.

Right: A scientist is pipetting a sample in a fume cupboard.

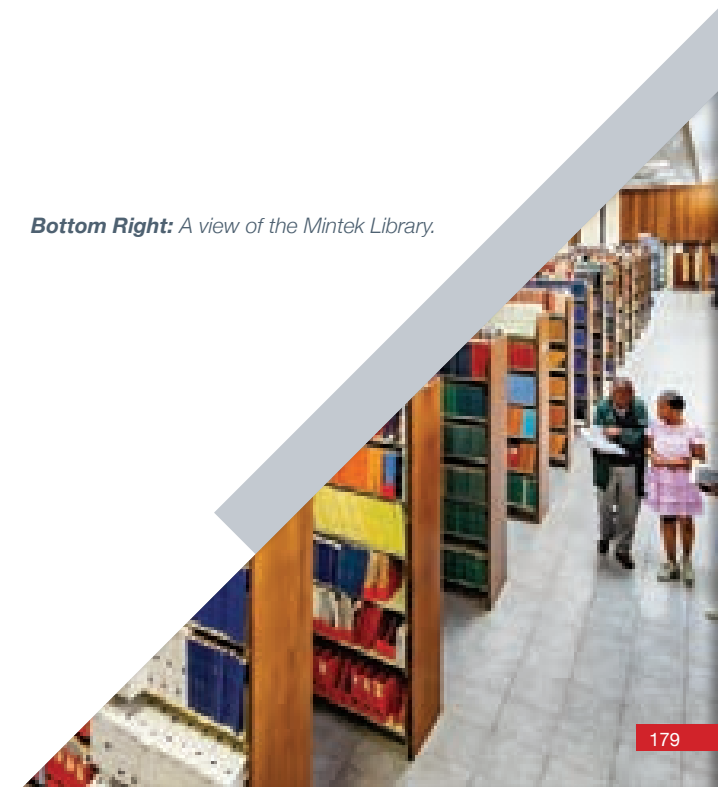


- 20. Mariekie Gericke, Buhle Xakalashé, Mathe M, Palaniyandy N, Kebede M, Luo H and Modibedi M.** Li-ion battery recycling, a SADC-20 year regional cooperation future 2023-2043. Battery Materials Conference, 24-25 August 2022, Misty Hills, South Africa, SAIMM.
- 21. Mbavhalelo Maumela, Joseph Moema and Thokozani Buthelezi.** Efficiency of different commercial TiBAI grain refiners on refinement of pure aluminum cast structures. The 23rd Annual International RAPDASA Conference joined by RobMech, PRASA and CoSAAMI November 9-11, 2022.
- 22. Mehdi Safari and Musa Dlame.** The effect of hydrodynamic cavitation device on the performance of the platinum group metals flotation. SAIMM PGM 8th International Conference, November 2-3, 2022.
- 23. Mehdi Safari, Veruska Govender, Deshenthree Chetty and Jestos Taguta.** Optimisation of a laboratory Hydrofloat™ separator in the coarse particle flotation of a PGM-bearing Platreef ore. 2022 IMPC Asia-Pacific 22 - 24 August 2022 Melbourne, Australia.
- 24. Odwa Mapazi.** The Determination of Low Phosphorus in Manganese Ferroalloys by Inductively Coupled Plasma Optical Emission Spectroscopy. Test & Measurement Conference 2022, 24-26 October 2022.
- 25. Olga Bazhko, J. Strauss and J. Taguta.** Stibnite behaviour during gold ore processing. Alta 2022, 20-27 May 2022, Perth, Australia.
- 26. Patricia Rangata, Happy Mabowa and Hlengiwe Mnculwane.** Method development for quantification of rare earth elements (REEs) in monazite ore samples by various spectroscopic techniques. Test & Measurement Conference 2022, 24-26 October 2022.
- 27. Petrus Van Staden, Barcza NA and Erasmus LJ.** Hydro-Pyro Integration for the Leaching of Cobalt and Nickel from converted Nickel Pig Iron matte. Battery Materials Conference, 24-25 August 2022, Misty Hills, South Africa, SAIMM.
- 28. Petrus Van Staden.** Heap Leaching Phenomena Quantified. Alta 2022, 20-27 May 2022, Perth, Australia.
- 29. Portia Madzivha, Bambesiwe May, Lebohlang Hlatshwayo, James Tshilongo, Abongile Jijana, Sandra M Graham and Heidi Richards.** Quantitative analysis of silver and gold nanomaterials in industrial wastewater. 8th International Conference on Nanoscience and Nanotechnology in Africa (NanoAfrica 2022) will be a face-to-face conference, on the dates 26 - 28 October 2022.
- 30. Quinn Reynolds and Oliver F Oxtoby.** Toward meso-scale modelling of slag foaming phenomena in pyrometallurgy. Proceedings of the Materials Processing Fundamentals symposium held at the TMS 2023 Annual Meeting & Exhibition, 19-23 March 2023.
- 31. Quinn Reynolds and SAC Hockaday.** The use of concentrating solar energy for thermal decomposition in oxide and carbonate minerals. Proceedings of TMS 2023 Annual Meeting & Exhibition - Advances in Pyrometallurgy, Developing Low Carbon Pathways Symposium, 21-23 March 2023.
- 32. Quinn Reynolds, Lunia Malaka, Violet Hilane, Anton Lopis, Markus Erwee, Leslie Glasser, Gerhard Venter and Johan Zietsman.** Physical properties of molten slags: Thermodynamics, transport and other properties obtained using molecular dynamics, empirical correlations, databases and neural networks. THANOS International Conference on Enhanced Use of Thermodynamic Data In Pyrometallurgy Teaching and Research 28-29 September 2022 Mintek.
- 33. Ramogohlo Diale, Joseph Moema, Maje Phasha, Phuti Ngoepe and Hasani Chauke.** Thermodynamic and Magnetic Properties of Pt50Mn50-xMx (M= Cr, Fe) Alloys: A first-Principles Study. The 23rd Annual International RAPDASA Conference joined by RobMech, PRASA and CoSAAMI November 9-11, 2022.
- 34. Ramogohlo Diale, Lebogang Motsomone, Phuti Ngoepe, Renier Koen, and Hasani Chauke.** Structural and mechanical properties of monazite type LnPO₄ (Ln = La, Ce, Pr and Nd). SA Institute of Physics, Proceedings of SAIP 2022, Division G: Theoretical and Computational Physics, 1-8 July 2022.
- 35. Ramogohlo Diale, Lebogang Motsomone, Phuti Ngoepe, Renier Koen, and Hasani Chauke.** Structural and Mechanical Properties of Monazite Type LnPO₄ (Ln = La, Ce, Pr and Nd). The 23rd Annual International RAPDASA Conference joined by RobMech, PRASA and CoSAAMI November 9-11, 2022.
- 36. Ramogohlo Diale, Tebogo Ledwaba, Phuti Ngoepe and Hasani Chauke.** Computational Studies of Structural, Mechanical and Magnetic Properties. The 23rd Annual International RAPDASA Conference joined by RobMech, PRASA and CoSAAMI November 9-11, 2022.
- 37. Rasoul Hassanalizadeh, Parisa Doubra and Elmar Mulle.** A flowsheet for extraction of ytterbium from zircon tailing. Alta 2022, 20-27 May 2022, Perth, Australia.
- 38. Rasoul Hassanalizadeh, Parisa Doubra, Calvin Mokwana and Elmar Muller.** Production of Stable Manganese Cathodes from highly Contaminated Advanced Electrolyte – an Experimental Case Study. Battery Materials Conference, 24-25 August 2022, Misty Hills, South Africa, SAIMM.
- 39. Refilwe Moeletsi, Deshenthree Chetty and Marina Yudovskaya.** Lithological study of contact-style Cu-Ni-PGE mineralisation in a shallow Platreef setting, with implications for processing. SAIMM PGM 8th International Conference, November 2-3, 2022.
- 40. Reinhardt Weideman, Quinn Reynolds, Kerri Du Preez and S.K.O. Ntwampe.** Modelling the Hydrodynamic Behaviour during Startup Conditions of a Biological Sulphate Reduction Process Treating High Sulphate Mine Influenced Water. ICARD 2022 - 12th International Virtual Conference on Acid Rock Drainage 2022, Australia, 18-24 September 2022.
- 41. Sam Moholwa, Pieter J. A. Bezuidenhout, Willem G. Le Roux and Joalet D. Steenkamp.** Experimental Analysis of Zinc Melting Using CSP. Proceedings of TMS 2023 Annual Meeting & Exhibition - Advances in Pyrometallurgy, Developing Low Carbon Pathways Symposium, 19-23 March 2023.
- 42. Sam Moholwa, Sello Tsebe, Derek Hayman, Pieter Johannes Andries Bezuidenhout, Martin Bongani Sitefane and Joalet Dalene Steenkamp.** Effect of Ore Pre-heating on Furnace Operation in High Carbon Ferromanganese Production—Lessons Learnt from Pilot-Scale Test Work. Proceedings of TMS 2023 Annual Meeting & Exhibition - Advances in Pyrometallurgy, Developing Low Carbon Pathways Symposium, 19-23 March 2023.
- 43. Sandile Nkwanyana and Indresan Govender.** Effect of pebbles on collisional environment in a ball mill using composite media (balls/pebbles). 2022 IMPC Asia-Pacific 22 - 24 August 2022 Melbourne, Australia.
- 44. Sifiso Sambo, Joalet D. Steenkamp and Pieter J. A. Bezuidenhout.** A Desktop Study on the Potential Use of South African Slags as Thermal Storage Medium. Proceedings of TMS 2023 Annual Meeting & Exhibition - Advances in Pyrometallurgy, Developing Low Carbon Pathways Symposium, 19-23 March 2023.
- 45. Tshilidzi Rampfumedzi, Napo Ntsasa, James Tshilongo and Prof Luke Chimuka.** Recovery of REEs in SA coal fly ash. Test & Measurement Conference 2022, 24-26 October 2022.
- 3. Nikiwe Mhlanga, Hendriette and Van der Walt.** Malaria Diagnostics. Malaria - Recent Advances and New Perspectives. Published: 28 August, 2022. ISBN 978-1-80356-791-4 (Print), 978-1-80356-793-8 (eBook). DOI: 10.5772/intechopen.106631
- 4. Ntsoaki Mphuthi, Abongile Jijana, Nikiwe Mhlanga, Munkombwe Muchindu, Sanele Nyembe, Bonex Mwakikunga, Gebhu Ndlovu and Lucky Sikhwivhilu.** Chemical warfare agents: an outlook on past and present technologies. Sensing of Deadly Toxic Chemical Warfare Agents, Nerve Agent Simulants, and their Toxicological Aspects, Pages 3-31, 2022. ISBN 978-0-323-90553-4 (Print), Amsterdam, Elsevier.
- 5. Phumlani Tetyana and Nikiwe Mhlanga.** Cellulose based Nano-Composites and Applications, Materials Research Foundations. Advanced Applications of Micro and Nano Clay Vol. 125, Page 236-253, 2022. ISBN 978-1-64490-190-8 (Print), ISBN 978-1-64490-191-5 (eBook), Materials Research Forum, United States.
- 6. Sanele Nyembe, Andile Mkhohlakali, Bambesiwe May and Nikiwe Mhlanga.** Application of Plasmonic Nanostructures in Molecular Diagnostics and Biosensor Technology: Challenges and Current Developments. Plasmonic Nanostructures - Basic Concepts, Optimization and Applications. Published: November 28th, 2022. ISBN 978-1-80356-003-8, ISBN978-1-80356-002-1 (Print) ISBN978-1-80356-004-5 (eBook), IntechOpen. DOI: 10.5772/intechopen.108319
- 7. Mokae Bambo, Bambesiwe May, Poslet Shumbula.** Surface Properties of Quantum Dots. Quantum Dots and Polymer Nanocomposites Synthesis, Chemistry, and Applications. 1st Edition, Published 29 December 2022. 9781003266518 (eBook), Boca Raton, CRC Press. <https://doi.org/10.1201/9781003266518>

11.3 | Book Chapters

- 1. Mariekie Gericke, John William Neale and Pasi Määttä.** Biomining in Finland: Commercial Application of Heap and Tank Bioleaching Technologies for Nickel Recovery. Biomining Technologies Extracting and Recovering Metals from Ores and Wastes. Pages 209-228, Published 15 November 2022. ISBN 978-3-031-05381-8 (Print), ISBN 978-3-031-05382-5, Springer Cham. <https://doi.org/10.1007/978-3-031-05382-5>
- 2. Mokae Bambo, Bambesiwe May and Poslet Shumbula.** Fabrication Methods of Quantum Dots-Polymer Composites. Quantum Dots and Polymer Nanocomposites. 1st Edition, Published 2022. 9781003266518 (eBook), Boca Raton, CRC Press. <https://doi.org/10.1201/9781003266518>

Bottom Right: A view of the Mintek Library.



12

PFMA Compliance and Reporting

Procurement by other means	182
Contract variations or expansions	196
Irregular Expenditure	198
Fruitless and Wasteful Expenditure	200



12 | Annual Report Disclosure

In terms of NATIONAL TREASURY INSTRUCTION NO. 4 OF 2022/2023: PFMA COMPLIANCE AND REPORTING FRAMEWORK, the following items are disclosed:

12.1 | Procurement by other means

If in a specific case it is impractical to invite competitive bids, the company may procure the required goods or services

by other means provided that the reasons for deviating from inviting competitive bids must be recorded and approved. Procurement by other means includes instances of limited bidding, procurement that occurs in emergency situations and urgent cases and written price quotations within the threshold

determined by National Treasury Instruction. The following cases of procurement by other means were recorded in the 2022/2023 financial year.

PROJECT DESCRIPTION	CATEGORY	NAME OF SUPPLIER	TYPE OF PROCUREMENT BY OTHER MEANS	CONTRACT NUMBER	VALUE OF CONTRACT R'000	CURRENCY
Breakdown of two generators	BREAKDOWN - GENERATORS	A.H.POWER SYSTEMS	Emergency	4500190536	54,380	ZAR
Repairs to DP3000 UPS machine	BREAKDOWN - UPS	A.H.POWER SYSTEMS	Emergency	4500190562	5,560	ZAR
Repairs to Clinic Generator	REPAIRS - GENERATOR	A.H.POWER SYSTEMS	Preferred Supplier	4500189964	11,110	ZAR
Repair Transformers	BREAKDOWN - TRANSFORMERS	ACTOM (PTY) LTD/LH Marthinusen	Emergency	4500189573	454,505	ZAR
Repair of Tap Changer	BREAKDOWN - EQUIPMENT	ACTOM (PTY) LTD/LH Marthinusen	Emergency	4500189764	185,000	ZAR
SAP Data Extraction Services	SPECIALISED SERVICES	ADAPT IT (PTY) LTD	Preferred Supplier	4500190299	457,380	ZAR
Service and Repair of Struers Metallographic Equipment	SERVICE - EQUIPMENT	ADVANCED LABORATORY SOLUTIONS	Sole Supplier	4500190552	89,626	ZAR
Service and Repair of Struers Metallographic Equipment	SERVICE - EQUIPMENT	ADVANCED LABORATORY SOLUTIONS	Sole Supplier	4500190584	52,742	ZAR
Thermocouples	CONSUMABLES	AE FURNACES MANUFACTURING CC	Preferred Supplier	4500189282	19,330	ZAR
Skalar machine servicing	SERVICE - EQUIPMENT	AE SOLUTIONS	Preferred Supplier	4500189348	92,120	ZAR
Procuring gearboxes	CONSUMABLES	AFRICAN MIXING TECHNOLOGIES (PTY) LTD	Preferred Supplier	4500190432	35,270	ZAR
Supply of Gas	CONSUMABLES	AFRICAN OXYGEN PTY LTD (AFROX) AND AIR LIQUIDE PTY LTD	Preferred Supplier	4600000259	7,300,000	ZAR
Study of H2S Gas Emissions	PROFESSIONAL SERVICE	AIRSHED PLANNING PROFESSIONALS	Preferred Supplier	4500189589	68,200	ZAR
Repairs to air conditioning units	BREAKDOWN - AIRCON	AIRVENTFIL (PTY) LTD	Emergency	4500190208	9,293	ZAR
Gas leak on aircon system repair	BREAKDOWN - AIRCON	AIRVENTFIL (PTY) LTD	Emergency	4500189386	79,170	ZAR
Gas controllers	SPECIALISED EQUIPMENT	ALICAT SCIENTIFIC	Preferred Supplier	4500189155	23,100	USD
Emergency repairs on boiler	BREAKDOWN - EQUIPMENT	ALLMECH CC	Emergency	4500190139	47,185	ZAR
Servicing of the Allmech electric boiler	BREAKDOWN - EQUIPMENT	ALLMECH CC	Preferred Supplier	4500190362	124,879	ZAR
Ultrasonic Atomiser	SPECIALISED EQUIPMENT	AMAZEMET	Sole Supplier	4500190214	260,000	EUR
Parts of the ICP-MS	SPARES - EQUIPMENT	ANATECH INSTRUMENTS (PTY) LTD	Preferred Supplier	4500190311	58,538	ZAR
Repair the Thermo Dionex Ion Chromatography	REPAIRS - EQUIPMENT	ANATECH INSTRUMENTS (PTY) LTD	Preferred Supplier	4500190546	47,030	ZAR
ICS 5000+ upgrade to dual system	SPECIALISED EQUIPMENT	ANATECH INSTRUMENTS (PTY) LTD	Preferred Supplier	4500189893	966,650	ZAR
Software Licence	SOFTWARE	ANDRITZ INC	Preferred Supplier	4500189835	11,250	USD

PROJECT DESCRIPTION	CATEGORY	NAME OF SUPPLIER	TYPE OF PROCUREMENT BY OTHER MEANS	CONTRACT NUMBER	VALUE OF CONTRACT R'000	CURRENCY
Breakdown of Joel Microprobe	BREAKDOWN - EQUIPMENT	ANGSTROM SCIENTIFIC (PTY) LTD	Emergency	4500189342	24,648	ZAR
Spares	SPARES - EQUIPMENT	APC INTERNATIONAL	Preferred Supplier	4500189399	2,700	USD
Servicing unloader head for the GA 160 Compressor	SERVICE - EQUIPMENT	ATLAS COPCO INDUSTRIAL SA	Preferred Supplier	4500190198	20,597	ZAR
Servicing of air compressor	SERVICE - EQUIPMENT	ATLAS COPCO INDUSTRIAL SA	Preferred Supplier	4500190296	29,781	ZAR
Supply solenoid and replace dryer fan & Replace emergency stop	REPAIR - EQUIPMENT	ATLAS COPCO INDUSTRIAL SA	Preferred Supplier	4500189897	41,663	ZAR
Breakdown of Air Dryer GA250FF APF192202	BREAKDOWN - EQUIPMENT	ATLAS COPCO SOUTH AFRICA (PTY) LTD	Preferred Supplier	4500189253	91,381	ZAR
Emerson Delta V software	SOFTWARE	AUTOMATED CONTROL SOLUTIONS	Sole Supplier	4500190188	52,486	ZAR
Delta B Guardian renewal	SOFTWARE	AUTOMATED CONTROL SOLUTIONS	Sole Supplier	4500189894	392,722	ZAR
DelltraV hardware & Switches	SOFTWARE	AUTOMATION AND CONTROL SOLUTIONS	Preferred Supplier	4500190513	605,315	ZAR
Transformer oil leak repair	BREAKDOWN - EQUIPMENT	BLACK GAUNTLET (PTY) LTD	Preferred Supplier	4500189800	15,798	ZAR
Repairing Hydraulic System	REPAIRS - EQUIPMENT	BMG GROUP	Preferred Supplier	4500190399	127,879	ZAR
Microbial Characterisation Test	SPECIALISED SERVICES	BRGM	Preferred Supplier	4500190131	8,300	EUR
Microbial Characterisation Test	SPECIALISED SERVICES	BRGM	Preferred Supplier	4500189306	12,200	EUR
Repair blocked drains	BREAKDOWN - DRAINS	BURGESS & PRESTON CC	Emergency	4500189963	6,720	ZAR
Spares	SPARES - EQUIPMENT	BURKERT SA	Preferred Supplier	4500189491	987,000	ZAR
Installation of Bruker	SPECIALISED SERVICES	CARL ZEISS (PTY) LTD	Preferred Supplier	4500189867	48,600	ZAR
SEM parts	SPARES - EQUIPMENT	CARL ZEISS (PTY) LTD	Preferred Supplier	4500189865	239,712	ZAR
Planetary Ball Mill	SPECIALISED EQUIPMENT	CELSIUS SCIENTIFIC CC	Preferred Supplier	4500190301	338,160	ZAR
Repair the prep-FAST autosample	BREAKDOWN - EQUIPMENT	CHEMETRIX	Emergency	4500190215	69,768	ZAR
Strip & Quote - Repairs to Ride on lawnmower	BREAKDOWN - EQUIPMENT	CREDENCE LAWNMOWER	Emergency	4500190240	19,175	ZAR
Service of 1 Forklift	BREAKDOWN - LIFTS	CRITERION EQUIPMENT	Emergency	4500190035	22,299	ZAR
Repair of three Forklifts	BREAKDOWN - LIFTS	CRITERION EQUIPMENT	Emergency	4500190134	215,739	ZAR
Repairs to two forklifts as per load test results	BREAKDOWN - LIFTS	CRITERION EQUIPMENT	Emergency	4500190058	195,918	ZAR
Strip and quote for repairing 3 forklifts	BREAKDOWN - LIFTS	CRITERION EQUIPMENT	Preferred Supplier	4500190463	251,371	ZAR
Geophysicist specialist expertise	SPECIALISED SERVICES	CSIR	Preferred Supplier	4500189359	38,912	ZAR
Furnace 1 - Re-installation	SPECIALISED SERVICES	DANDO DIENENTHAL	Preferred Supplier	4500190187	221,447	ZAR
Microfluidics Microfluidizer	SPECIALISED EQUIPMENT	Dedicated Analytical Solutions	Preferred Supplier	4500190183	3,201,847	ZAR
HO5 Polaris Meter	SPECIALISED EQUIPMENT	DEEP BLUE AQUA	Preferred Supplier	4500189276	32,640	ZAR

PROJECT DESCRIPTION	CATEGORY	NAME OF SUPPLIER	TYPE OF PROCUREMENT BY OTHER MEANS	CONTRACT NUMBER	VALUE OF CONTRACT R'000	CURRENCY
Consultancy on PREMA project	PROFESSIONAL SERVICE	DEREK HAYMAN	Specialist Expertise	4500189026	48,000	ZAR
Repairs to surveillance system	BREAKDOWN - EQUIPMENT	DEVTECH	Emergency	4500190073	16,135	ZAR
Diligent boards tool	SOFTWARE	DILIGENT SOFTWARE	Proprietary Software/License	4500189300	588,432	ZAR
AFS Licenses	SOFTWARE	DUCHARME ASSET MANAGEMENT	Preferred Supplier	4500190483	112,250	ZAR
Consumables	CONSUMABLES	DVL TRADING	Preferred Supplier	4500189874	7,626	ZAR
Spares	MANUFACTURING SPARES	EA INSTRUMENTS	Preferred Supplier	4500189460	3,600	GBP
Access control management software	SOFTWARE	EAGLE AFRICA TECHNOLOGY	Preferred Supplier	4500190101	38,060	ZAR
Liquid Leak Detector	MANUFACTURING SPARES	ELECTROL SUPPLY CORP	Preferred Supplier	4500189478	14,252	USD
Electrical Enclosures	MANUFACTURING SPARES	ELEN ELECTRICAL ENCLOSURES	Preferred Supplier	4500189302	329,699	ZAR
Science Direct 2022	SOFTWARE	ELSEVIER SCIENCE PUBLISHERS	Sole Supplier	4500189401	63,548	USD
PH Redox meters	CONSUMABLES	ENDRESS AND HAUSER	Preferred Supplier	4500189147	46,044	ZAR
Kepware OPC	SOFTWARE	ETX DATA SERVICES	Preferred Supplier	4500189217	448,627	ZAR
Procurement of 3 way Taps	BREAKDOWN - EQUIPMENT	FIRETIGHT SOLUTIONS	Emergency	4500190558	7,005	ZAR
JK Drop weight test	SPECIALISED SERVICES	GEOLABS GLOBAL (PTY) (LTD)	Preferred Supplier	4500190097	81,860	ZAR
SMC Tests	SPECIALISED SERVICES	GEOLABS GLOBAL (PTY) (LTD)	Preferred Supplier	4500190449	48,718	ZAR
SMC Tests	SPECIALISED SERVICES	GEOLABS GLOBAL (PTY) (LTD)	Preferred Supplier	4500190615	81,860	ZAR
JK Drop weight and SMC tests	SPECIALISED SERVICES	GEOLABS GLOBAL (PTY) (LTD)	Preferred Supplier	4500190616	48,718	ZAR
Repairs to chiller units	BREAKDOWN - EQUIPMENT	GINGER BROWN	Emergency	4500190091	17,158	ZAR
Research chemicals	CONSUMABLES	GLASSWORLD & CHEMICALS	Preferred Supplier	4500189795	27,836	ZAR
Graphite Electrodes	CONSUMABLES	GRAPHITE ELECTRODE	Emergency	4500190009	78,422	ZAR
PH Meters	SPECIALISED EQUIPMENT	HANNA INSTRUMENTS (PTY) LTD	Preferred Supplier	4500190613	81,877	ZAR
pH Electrodes	SPECIALISED EQUIPMENT	HANNA INSTRUMENTS (PTY) LTD	Preferred Supplier	4500189912	82,107	ZAR
Repair the 300 kVA power supply	BREAKDOWN - UPS	HYPOWER HEAVY CURRENT MAINTENANCE	Emergency	4500189568	168,038	ZAR
Furnace Heating Elements	CONSUMABLES	IA HEATING SYSTEMS	Preferred Supplier	4500189682	86,310	ZAR
X-Ray Diffraction (XRD) License Software Database	SOFTWARE	ICDD	Sole Supplier	4500190611	9,246	USD
Technical expertise for GDP Energy Furnace control projects	PROFESSIONAL SERVICE	IMPROVE IO	Specialist Expertise	4500189173	19,200	AUD
Technical expertise for PREMA project	PROFESSIONAL SERVICE	IMPROVE IO	Specialist Expertise	4500189224	12,800	AUD
Servicing of the XRF instrument	SERVICE - EQUIPMENT	INNOV-X AFRICA	Sole Supplier	4500189004	56,934	ZAR
PaySpace payroll solution	SOFTWARE	INSIGHT IT SOLUTIONS (PTY) LTD	Proprietary Software/License	4500188900	247,677	ZAR

PROJECT DESCRIPTION	CATEGORY	NAME OF SUPPLIER	TYPE OF PROCUREMENT BY OTHER MEANS	CONTRACT NUMBER	VALUE OF CONTRACT R'000	CURRENCY
Furnace Heating Elements	CONSUMABLES	IA HEATING SYSTEMS	Preferred Supplier	4500189682	86,310	ZAR
X-Ray Diffraction (XRD) License Software Database	SOFTWARE	ICDD	Sole Supplier	4500190611	9,246	USD
Technical expertise for GDP Energy Furnace control projects	PROFESSIONAL SERVICE	IMPROVE IO	Specialist Expertise	4500189173	19,200	AUD
Technical expertise for PREMA project	PROFESSIONAL SERVICE	IMPROVE IO	Specialist Expertise	4500189224	12,800	AUD
Servicing of the XRF instrument	SERVICE - EQUIPMENT	INNOV-X AFRICA	Sole Supplier	4500189004	56,934	ZAR
PaySpace payroll solution	SOFTWARE	INSIGHT IT SOLUTIONS (PTY) LTD	Proprietary Software/License	4500188900	247,677	ZAR
Replacement of JKDropstest	SPECIALISED EQUIPMENT	JK TECH	Preferred Supplier	4500190540	103,230	AUD
Deep cleaning for Canteen	BREAKDOWN - EQUIPMENT	KHULULEKO CLEANING SERVICES CC	Emergency	4500190372	26,500	ZAR
Purchasing of 3 way taps	BREAKDOWN - EQUIPMENT	LABFURN MANUFACTURING	Emergency	4500190557	14,800	ZAR
Maintenance and repairs of Parr 2 Reactor	REPAIR - EQUIPMENT	LABOTEC (PTY) LTD	Sole Supplier	4500189050	81,486	ZAR
Annual Periodic Upgrade & Maintenance Programme	SOFTWARE	LABWARE AFRICA (PTY) LTD	Sole Supplier	4500190164	287,206	ZAR
LabWare LIMS licences	SOFTWARE	LABWARE AFRICA (PTY) LTD	Proprietary Software/License	4500189345	273,529	ZAR
Procure 7000 HIV1&2 rapid diagnostic tests	SPECIALISED SERVICES	LATERAL FLOW LABORATORIES (PTY) LTD	Sole Supplier	4500190162	142,000	ZAR
Batch Manufacturing Validation	SPECIALISED SERVICES	LATERAL FLOW LABORATORIES (PTY) LTD	Preferred Supplier	4500190446	114,000	ZAR
Validation of locally manufactured foil pouches for the HIV test kits	SPECIALISED SERVICES	LATERAL FLOW LABORATORIES (PTY) LTD	Preferred Supplier	4500189574	60,000	ZAR
Covid19 PCR Kits	SPECIALISED SERVICES	LTC TECH SOUTH AFRICA PTY LTD	Preferred Supplier	4500189249	124,954	ZAR
Repair of the CEM Microwave	REPAIR - EQUIPMENT	MAD TECHNOLOGY (PTY) LTD	Sole Supplier	4500190489	125,404	ZAR
Service of CETAC Auto sampler ASX 520	SERVICE - EQUIPMENT	MAD TECHNOLOGY (PTY) LTD	Preferred Supplier	4500189709	48,200	ZAR
PSD Online Management system	SOFTWARE	MAESTRO ITALY	Preferred Supplier	4500190158	8,000	EUR
ARF gas	CONSUMABLES	MATERIALYTICS	Preferred Supplier	4500189869	5,288	USD
Gas Emission Monitoring	PROFESSIONAL SERVICE	MAWENJE CONSULTING SERVICES	Preferred Supplier	4500190174	48,850	ZAR
KNICK Meters	SPECIALISED EQUIPMENT	MECOSA (PTY) LTD	Preferred Supplier	4500189207	223,792	ZAR
Research chemicals - Tapa	CONSUMABLES	MERCK LIFE SCIENCE (PTY) LTD	Preferred Supplier	4500190378	411,300	ZAR
Maintenance on the Millipore	SERVICE - EQUIPMENT	MERCK LIFE SCIENCE (PTY) LTD	Preferred Supplier	4500189267	33,236	ZAR
Spares	MANUFACTURING SPARES	METROHM S.A (PTY) LTD	Preferred Supplier	4500189350	593,430	ZAR
Repair of the ion chromatography instrument	BREAKDOWN - EQUIPMENT	METROHM S.A (PTY) LTD	Emergency	4500189444	37,379	ZAR
pH Sensors and Cables	SPECIALISED EQUIPMENT	MICROSEP	Preferred Supplier	4500189130	61,232	ZAR
Microsoft Licences	SOFTWARE	MICROSOFT IRELAND OPERATIONS LTD	Proprietary Software/License	4500190590	8,052	USD
Microsoft Licences	SOFTWARE	MICROSOFT IRELAND OPERATIONS LTD	Proprietary Software/License	4500189563	11,370	USD

PROJECT DESCRIPTION	CATEGORY	NAME OF SUPPLIER	TYPE OF PROCUREMENT BY OTHER MEANS	CONTRACT NUMBER	VALUE OF CONTRACT R'000	CURRENCY
Microsoft Licences	SOFTWARE	MICROSOFT IRELAND OPERATIONS LTD	Proprietary Software/ License	4500189396	82,147	USD
Microsoft Licences	SOFTWARE	MICROSOFT IRELAND OPERATIONS LTD	Proprietary Software/ License	4500189397	89,422	USD
Repair the BestCode CIJ Printer	REPAIR - EQUIPMENT	MITAS CORPORATION (PTY) LTD	Sole Supplier	4500190497	43,639	ZAR
Fasteners	CONSUMABLES	MULTI ALLOYS	Preferred Supplier	4500189824	14,852	ZAR
Fasteners	CONSUMABLES	MULTI ALLOYS	Preferred Supplier	4500190182	63,955	ZAR
Spares	CONSUMABLES	NEVEN MATTHEWS (PTY) LTD	Sole Supplier	4500189016	40,607	ZAR
Lance Rods	CONSUMABLES	NEVEN MATTHEWS (PTY) LTD	Sole Supplier	4500190625	105,334	ZAR
Design-Espert V13 Software (DX13)	SOFTWARE	NICOLAAS FRANCOIS LAUBSCHER	Preferred Supplier	4500189661	45,420	ZAR
Optimisation of the HVAC plant	SPECIALISED SERVICES	NZWALO INVESTMENT T/A LUMACON	Preferred Supplier	4500190448	498,962	ZAR
Repair of chillers	BREAKDOWN - EQUIPMENT	NZWALO INVESTMENT T/A LUMACON	Emergency	4500189480	183,448	ZAR
Mintek Chiller Water Repairs	BREAKDOWN - EQUIPMENT	NZWALO INVESTMENT T/A LUMACON	Emergency	4500189974	28,917	ZAR
LIMS Support 2 months	SPECIALISED SERVICES	ONECONNECT SOLUTIONS	Preferred Supplier	4500190460	123,480	ZAR
LIMS analytics software + Automation services	SOFTWARE	ONECONNECT SOLUTIONS	Sole Supplier	4500189036	116,761	ZAR
Mathworks Software	SOFTWARE	OPTI-NUM SOLUTIONS	Sole Supplier	4500189180	101,920	ZAR
Woodchips	CONSUMABLES	ORICOLES	Preferred Supplier	4500190247	42,550	ZAR
Ossila Slot-Die Coater (L2005A-EU 1-E)	SPECIALISED EQUIPMENT	OSSILA LIMITED	Preferred Supplier	4500189803	120,600	ZAR
Repair ICP MS NEXION 300Q	REPAIR - EQUIPMENT	PERKINELMER SOUTH AFRICA (PTY) LTD	Preferred Supplier	4500189686	47,621	ZAR
Recruitment Services	PROFESSIONAL SERVICE	P-NET	Preferred Supplier	4500190040	571,844	ZAR
Polymer Columns.	SPECIALISED EQUIPMENT	POLIMATRIX SA (PTY) LTD	Preferred Supplier	4500190324	108,900	ZAR
Design and fabrication of polypropylene leach columns	SPECIALISED EQUIPMENT	POLIMATRIX SA (PTY) LTD	Preferred Supplier	4500189242	236,865	ZAR
Repairs of HPGR	REPAIRS - EQUIPMENT	POLYSIUS	Preferred Supplier	4500189291	103,175	ZAR
Repairs to Bay 5 Crane	BREAKDOWN - EQUIPMENT	PRO CRANE SERVICES	Emergency	4500190434	27,747	ZAR
Cynoprobe Commissioning	SPECIALISED SERVICES	PROCESS IQ	Preferred Supplier	4500189327	44,160	AUD
Online project management software	SOFTWARE	PROJECT MANAGER	Preferred Supplier	4500189909	5,100	USD
Cynoprobe and C2 Meter Boards	MANUFACTURING SPARES	PROJECTS CONCERN MANUFACTURING (PTY) LTD	Preferred Supplier	4500189002	200,200	ZAR
Flux UG2	CONSUMABLES	PROTEA MINING CHEMICALS	Preferred Supplier	4500189762	91,050	ZAR
Flux UG2 NICKEL SULPHIDE, 25KG BAG	CONSUMABLES	PROTEA MINING CHEMICALS	Preferred Supplier	4500189926	90,000	ZAR
Research consumables - Chemicals	CONSUMABLES	PROTEA MINING CHEMICALS	Preferred Supplier	4500189794	63,600	ZAR

PROJECT DESCRIPTION	CATEGORY	NAME OF SUPPLIER	TYPE OF PROCUREMENT BY OTHER MEANS	CONTRACT NUMBER	VALUE OF CONTRACT R'000	CURRENCY
FLUX UG2 NICKEL SULPHIDE, 25KG BAG	CONSUMABLES	PROTEA MINING CHEMICALS	Preferred Supplier	4500189926	90,000	ZAR
Breakdown - Repairs to ESAB Welding machines	BREAKDOWN - EQUIPMENT	PTS WELDING AND INDUSTRIAL SUPPLIES	Emergency	4500189986	25,255	ZAR
Freudenberg Gas Diffusion Layers	CONSUMABLES	QUINTECH	Preferred Supplier	4500189980	3,450	EUR
Spares	MANUFACTURING SPARES	R.S COMPONENTS	Preferred Supplier	4500189364	47,356	ZAR
Land Cyclops Pyrometer	SPECIALISED EQUIPMENT	REPCAL SERVICES	Preferred Supplier	4500189193	45,000	ZAR
Enclosures for Cynoprobes	MANUFACTURING SPARES	RITTAL (PTY) LTD	Sole Supplier	4500189340	428,039	ZAR
Enclosures for Cynoprobes	MANUFACTURING SPARES	RITTAL (PTY) LTD	Sole Supplier	4500189414	55,875	ZAR
TechConnect License Renewal	SOFTWARE	ROCKWELL AUTOMATION (PTY) LTD	Sole Supplier	4500189581	38,531	ZAR
RSLinx Classic OPC software	SOFTWARE	ROCKWELL AUTOMATION (PTY) LTD	Preferred Supplier	4500189398	94,037	ZAR
Automation hardware	SOFTWARE	ROCKWELL AUTOMATION (PTY) LTD	Preferred Supplier	4500190416	36,782	ZAR
Automation hardware	SOFTWARE	ROCKWELL AUTOMATION (PTY) LTD	Preferred Supplier	4500190491	43,415	ZAR
Subscription	SOFTWARE	SABINET ONLINE (PTY)	Sole Supplier	4500190038	455,837	ZAR
Manufacture Top Weigt Frame	SPECIALISED EQUIPMENT	SASCO METROLOGY SERVICE	Preferred Supplier	4500190172	187,872	ZAR
BMS Software Upgrade	SOFTWARE	SATCHTECH SOLUTIONS (TY) LTD	Sole Supplier	4500189370	43,400	ZAR
Water damage repairs to block 11000 lift	BREAKDOWN - LIFTS	SCHINDLER LIFTS	Emergency	4500190132	180,269	ZAR
Custom Made Filter Sock Shorts	MANUFACTURING SPARES	SEFAR FILTER PURE (PTY) LTD	Preferred Supplier	4500189580	151,500	ZAR
eWON Flexy 205	MANUFACTURING SPARES	SHORROCK AUTOMATION (PTY) LTD	Sole Supplier	4500189195	511,554	ZAR
Spares	MANUFACTURING SPARES	SMC CORPORATION	Preferred Supplier	4500189362	19,903	ZAR
SnapComms Licences	SOFTWARE	SNAPCOMMS LIMITED	Sole Supplier	4500190370	5,445	USD
Cynoprobe and C2 Meter Boards	MANUFACTURING SPARES	SPECIALISED MANUFACTURING TECHNOLOGY	Preferred Supplier	4500190016	997,262	ZAR
Cynoprobe and C2 Meter Boards	MANUFACTURING SPARES	SPECIALISED MANUFACTURING TECHNOLOGY	Preferred Supplier	4500189033	351,013	ZAR
Service of FEI system	SERVICE - EQUIPMENT	SPS ELECTRON OPTICS SERVICES (PTY) LTD	Preferred Supplier	4500189990	307,669	ZAR
MAC Potentiostat Boards	MANUFACTURING SPARES	SRE DEVELOPMENT CC	Preferred Supplier	4500190017	214,125	ZAR
MGO Crucibles	CONSUMABLES	TATEHO AZARK	Preferred Supplier	4500189566	3,920	USD
Zoom License	SOFTWARE	TERTIARY EDUCATION & RESEARCH NETWORK	Preferred Supplier	4500190086	35,964	ZAR
FactSage Software	SOFTWARE	THERMFACT USA	Proprietary Software/ License	4500189732	24,423	USD
FactSage Software	SOFTWARE	THERMFACT USA	Sole Supplier	4500189684	4,830	USD
Spares	MANUFACTURING SPARES	THERMOCOUPLE PRODUCTS (PTY) LTD	Preferred Supplier	4500189482	162,375	ZAR
HPGR Repairs	REPAIRS - EQUIPMENT	THYSSENKRUPP INDUSTRIAL SOLUTIONS	Preferred Supplier	4500189291	103,175	ZAR

PROJECT DESCRIPTION	CATEGORY	NAME OF SUPPLIER	TYPE OF PROCUREMENT BY OTHER MEANS	CONTRACT NUMBER	VALUE OF CONTRACT R'000	CURRENCY
Subscription - Software	SOFTWARE	TRADEBRICS (PTY) LTD	Sole Supplier	4500189896	67,410	ZAR
Servicing of Hydraulic Power Pack	SERVICE - EQUIPMENT	TRIBO TECHNICAL SERVICES	Preferred Supplier	4500189069	183,700	ZAR
design, management & reporting of clinical trials for HIV1&2 test kits	SPECIALISED SERVICES	UBUNTU CLINICAL RESEARCH	Preferred Supplier	4500190150	6,777,093	ZAR
XRF Machine repair	BREAKDOWN - EQUIPMENT	UNITED SCIENTIFIC	Emergency	4500190072	215,401	ZAR
Microbial DNA Extraction	SPECIALISED SERVICES	UNIVERSITY OF CAPE TOWN	Preferred Supplier	4500189182	55,486	ZAR
Spares	MANUFACTURING SPARES	VAN LONDON	Preferred Supplier	4500189497	4,115	USD
Sensors	MANUFACTURING SPARES	VEGA CONTROLS SA (PTY) LTD	Preferred Supplier	4500190555	31,890	ZAR
Minifurn Spares	MANUFACTURING SPARES	VEGA CONTROLS SA (PTY) LTD	Preferred Supplier	4500189558	49,990	ZAR
Perchloric fumehood breakdown	BREAKDOWN - EQUIPMENT	VIVID AIR CC	Emergency	4500189470	20,100	ZAR
Pumps	SPECIALISED EQUIPMENT	WATSON MARLOW	Preferred Supplier	4500189076	337,626	ZAR
Procuring a new spillage pump	SPECIALISED EQUIPMENT	WEIR MINERALS SOUTH AFRICA (PTY) LTD	Preferred Supplier	4500190397	92,339	ZAR
Breakdown of WD XRF	BREAKDOWN - EQUIPMENT	WIRSAM SCIENTIFIC AND PRECISION EQUIPMENT (PTY) LTD	Emergency	4500189281	15,312	ZAR
Rigaku ZSX Primus Iv Repair	REPAIR - EQUIPMENT	WIRSAM SCIENTIFIC AND PRECISION EQUIPMENT (PTY) LTD	Preferred Supplier	4500190457	56,922	ZAR
R2R lab-scale coater	SPECIALISED EQUIPMENT	Yasui Seiki MIRWEC Coating	Sole Supplier	4500190184	276,300	USD

12.2 | Contract variations or expansions

The company may expand a contract by increasing the scope of work or vary a contract by changing the scope of work provided that the necessary approvals are obtained.

The following contract expansions/variations were incurred in the 2022/2023 financial year. All expansions/variations are listed for information purposes.

PROJECT DESCRIPTION	NAME OF SUPPLIER	CONTRACT MODIFICATION TYPE (EXPANSION/VARIATION)	CONTRACT NUMBER	ORIGINAL CONTRACT VALUE R'000	VALUE OF PREVIOUS CONTRACT EXPANSION OR VARIATION R'000	VALUE OF CURRENT CONTRACT EXPANSION OR VARIATION R'000
Waste management services	Clean Dot Waste (Pty) Ltd	Expansion	4600000236	680,391	None	793,790
Provision of canteen services	Mndhavazi Trading Enterprise	Expansion	4600000190	2,200,992	None	194,552
Provision of security services	Mfanyana Trading Enterprise	Expansion	4600000173	20,196,573	None	916,440
Supply of assembly and wiring control panels	Aurora Panel Assembling Enterprise CC	Expansion	4600000202	1,816,678	None	576,801
Servicing of air conditioning systems - Repairs to VRV system	Airventfil (Pty) Ltd	Expansion	4600000197	306,705	None	62,697
Network Infrastructure Upgrade	Khanya Africa Networks CC	Expansion	4600000274	26,684,749	None	303,361
IFS Implementation, hosting and support	Tech Mahindra South Africa (Pty) Limited	Expansion	4600000222	32,954,880	None	10,574,499
SAP support services - 5 months	ADAPT IT (PTY) LTD	Variation	4500190078	189,000	31,500	125,000
SAP Functional and Technical Support Additional Month	ADAPT IT (PTY) LTD	Variation	4500188958	189,000	-	31,500
Refurbishing thrust blocks	AMATSHESIZWE PROJECTS	Variation	4500189021	220,962	-	35,460
Additional License	DILIGENT SOFTWARE	Variation	4500189300	588,432	-	8,864
Laptop Rentals	GO RENTALS	Variation	4500190203	595,980	-	292,170
Purchasing an EH Probe for the PH Meter	LABOTEC (PTY) LTD	Variation	4500190572	91,984	-	45,809
Rehabilitation of Asbestos mine in Uitkyk, Limpopo	LAFATA CHEMICALS MANUFACTURING	Variation	4500187206	18,869,680	2,604,581	516,431
Installation of Sound Proof	MANYAWUSI TRADING ENTERPRISE	Variation	4500189015	55,089	-	7,700
Additional asbestos contaminated areas on Riries farm by Project	MASHELENI TRADING AND PROJECTS	Variation	4500190334	35,265,591	-	3,192,834
Contract for tactical security service provider MNTK15/2019	MI7 NATIONAL GROUP (PTY) LT	Variation	4500190338	19,121,194	-	3,859,989
Audit fees	NGUBANE AND COMPANY	Variation	4500189813	394,380	-	15,946
Change of enclosure material of construction	PROCESS AUTOMATION	Variation	4500189297	152,136	-	-3,481
Surveillance Audit Price Increase Year 2	SGS SOUTH AFRICA (PTY) LTD	Variation	4500186922	88,610	-	5,959

12.3 Irregular Expenditure

The Irregular Expenditure incurred is disclosed below.

Reconciliation of irregular expenditure

	2022/2023	2021/2022	2020/2021
Description	R'000	R'000	R'000
Opening balance	35,452,463	26,793,140	9,402,738
Add: Irregular expenditure confirmed	17,197,653	8,659,323	17,390,402
Less: Irregular expenditure not condoned and removed	-502,704	-	-
Closing balance	52,147,412	35,452,463	26,793,140

A significant portion of the irregular expenditure that has been carried forward from 2020/2021 relates to a multiyear project where payments have been made annual as the work has been executed.

The irregular expenditure that was not condoned and removed relates to cases that were subsequently further investigated by independent auditors and it was found that it does not constitute irregular expenditure.

Reconciling notes to the annual financial statement disclosure

	2022/2023	2021/2022
Description	R'000	R'000
Irregular expenditure that was under assessment in the previous financial year	16,609,221	6,808,770
Irregular expenditure for the current year	588,432	1,850,553
Total	17,197,653	8,659,323

During the year ended March 2023, only one instance of irregular expenditure was identified.

b) Details of current and previous year irregular expenditure (under assessment, determination, and investigation)

	2022/2023	2021/2022
Description	R'000	R'000
Irregular expenditure under assessment	588,432	1,071,663
Irregular expenditure under determination	1,071,663	618,890
Irregular expenditure under investigation	-	160,000
Total	1,660,095	1,850,553

c) Details of current and previous year disciplinary or criminal steps taken as a result of irregular expenditure

	2022/2023	2021/2022
Description	R'000	R'000
Disciplinary proceedings concluded	837,764	-
Disciplinary steps in progress	48,399,491	-
Total	49,237,255	-

12.4 | Fruitless and Wasteful Expenditure

The Fruitless and Wasteful Expenditure incurred is disclosed below.

Fruitless and Wasteful expenditure Reconciliation of irregular expenditure

	2022/2023	2021/2022	2020/2021
Description	R'000	R'000	R'000
Opening balance	13,002	11,503	5,723
Add:Fruitless and Wasteful expenditure confirmed	753,891	1,499	5,781
Closing balance	766,894	13,002	11,503

Fruitless expenditure for 2020/2021 and 2021/2022 relates to interest payable on late payment of City of Johannesburg invoices. The 2023 Fruitless expenditure relates to interest that was paid in terms of an arbitration agreement.

Reconciling notes to the annual financial statement disclosure

	2022/2023	2021/2022
Description	R'000	R'000
Fruitless and Wasteful expenditure for the current year	753,891	1,499
Total	753,891	1,499

b) Details of current and previous year Fruitless and Wasteful expenditure (under assessment, determination, and investigation)

	2022/2023	2021/2022
Description	R'000	R'000
Fruitless and Wasteful expenditure under assessment	753,891	13,002
Total	753,891	13,002

In the 2020/2021 financial year an arbitration agreement was awarded relating to gas supply where Mintek was ordered to make payments over the next three financial years. The determination was concluded in the current year where the agreement was found to not be fruitless and wasteful. The process of removal will be followed in the next financial year.







Annual Integrated Report | **2022 / 2023**