Department of Mineral Resources

SHAREHOLDER PERFORMANCE AGREEMENT ("SHAREHOLDER COMPACT")

(2016/17)

Entered into by and between the

MINTEK BOARD,
(herein represented by the Chairperson of the Board)

and

THE GOVERNMENT
of the
REPUBLIC OF SOUTH AFRICA,
(herein represented by the Minister of Mineral Resources)

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1.1 Introduction

1.1.1 Regulation 29 of the Treasury Regulations issued in terms of the Public Finance Management Act No. 1 of 1999, as amended by Act 29 of 1999 ("PFMA"), stipulates that the Accounting Authority of a public entity listed in Schedule 3 must, in consultation with its Executive Authority, annually conclude a Shareholder Compact.

1.1.2 This Shareholder Compact is the performance agreement between the Accounting Authority and the Executive Authority envisaged in Regulation 29. It documents the key performance measures and indicators to be attained by the public entity during a financial year, which stem from the mandate of Mintek as articulated in the Mineral Technology Act No. 30 of 1989.

1.1.3 The Shareholder Compact also comprises the agreed principles, key performance objectives, programmes, activities (measures) and indicators.

1.2 Interpretation

In this Shareholder Compact, unless otherwise indicated or contrary to the context, the words and phrases set out below shall have the meanings ascribed to them as follows:

1.2.1 An **Accounting Authority** of a national public entity is the Board of Directors appointed by the Executive Authority of that entity.

1.2.2 **Board** refers to the Mintek Board of Directors.

1.2.3 **Executive Authority** refers to the Minister.

1.2.4 **Mindev** refers to Mindev (Pty) Ltd, a company with limited liability in terms of the Companies Act No. 71 of 2008, which is a wholly-owned subsidiary of Mintek, and has its registered head office at the same address as Mintek.

1.2.5 **Minister** refers to the Honourable Minister of Mineral Resources in his/her capacity as such.

1.2.6 **Mintek** is a Science Council established in terms of the Mineral Technology Act No. 30 of 1989, with its principal place of business situated at 200 Malibongwe Drive, Randburg, South Africa.

1.2.7 **Party** refers to either the shareholder or Mintek and **parties** mean both the shareholder and Mintek.

1.2.8 **PFMA** refers to the Public Finance Management Act No. 1 of 1999 as amended by Act No. 29 of 1999.

1.2.9 **R&D** refers to research and development as set out in the Mineral Technology Act No. 30 of 1989.

1.2.10 **Shareholder** refers to the Government of the Republic of South Africa, represented by the Minister.

1.2.11 **Shareholder Compact** refers to the performance agreement between the Board and the Shareholder together with all appendices attached hereto, as defined in the PFMA.

1.3 Nature of the Shareholder Compact

1.3.1 The Shareholder Compact is designed solely to regulate the relationship between the Shareholder and the Board.

1.3.2 The Shareholder Compact is not intended to:

(i) Interfere in any way with the normal company law principles and the normal relationship between the Shareholder, on the one hand, and the Board, on the other. In giving effect to those principles, the Shareholder would have communicated its expectations to the Board and management;

(ii) Create rights and expectations that third parties may rely upon. It is hereby specifically recorded that this Shareholder Compact does not create, confer and/or afford any third party rights or expectations in terms hereof.

1.4 Period

1.4.1 As contemplated in terms of the PFMA, this Shareholder Compact will be effective for the period 1 April 2016 to 31 March 2017.

1.4.2 It is hereby recorded that the agreed principles, although subject to review annually, set out matters that are applicable beyond a period of a year. In the event that they are amended, the parties shall take into account initiatives already commenced on the basis of such principles.

1.5 Mandate, Vision and Mission of Mintek

1.5.1 The mandate of Mintek, as outlined in the Mineral Technology Act (Act No. 30 of 1989), 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.

1.5.2 The Shareholder acknowledges that, included in its mandate, Mintek has a developmental role that may require decisions that are not always optimal from a commercial perspective, but contribute to growth and development in South Africa and the rest of the continent.

1.5.3 The **vision** of Mintek is to be a global leader in mineral and metallurgical innovation.

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

1.6 Strategic Intent & Objectives

1.6.1 The strategic intent and objectives of Mintek are closely aligned with national imperatives and priorities, these include (a) maximising the utilisation of finite ore resources, (b) alleviating poverty and creating employment, (c) adding value to mineral and metal products and (d) promoting the transition from a resource-dominated economy to a knowledge-based economy.

1.6.2 In order to attain its strategic intent, Mintek shall strive to:

i. **Enhance visibility and credibility among stakeholders** by implementing an integrated marketing and communications function;

ii. **Research and develop efficient mineral processing technologies and value added products and services** in order to, amongst others, strengthen Mintek's position as a global supplier of mineral processing technologies, equipment, process design and control optimisation systems;

iii. **Promote the mineral-based economies of rural and marginalised communities** through technical assistance and skills development by establishing appropriate technologies and strategies with the aim to expand the industry and to lower entry barriers. Also to initiate poverty alleviation programmes and to support the growth of Small, Medium and Micro Enterprises (SMMEs) in the mineral sector;

iv. **Uphold good governance practices** that comply with all applicable national and international regulatory frameworks and standards, maintain fiscal discipline, and enhance organisational efficiencies;

v. **Develop human capital and organisational skills to build world class R&D excellence** while transforming its internal and external business processes and the workforce profile to ensure that they are in line with the socio-economic realities of South Africa.

In pursuit of its strategy, Mintek will focus its research and development activities in the following areas:

- Commodity sectors of particular economic importance to South Africa (platinum group metals, gold, iron, manganese and chromite ores);
- Energy minerals (uranium, thorium and coal);
- "Technology metals" of strategic importance in high technology applications (titanium, magnesium, Rare Earths);
- Mineral processing technologies that minimise the consumption of energy and water, and minimise environmental impact;
- Addressing point sources of environmental impact and environmental damage caused by mining activities, including rehabilitation of derelict and ownerless mines and development of technology for the treatment of acid mine drainage;
- Maximising the value derived from South Africa's mineral industry by promoting value-added downstream beneficiation and novel value-added metal products;
- Developing technologies for exploiting currently non-viable ore resources;
- Facilitating the entry of SMMEs and junior resource companies to the industry.

Mintek will continue to develop appropriate, innovative technological solutions for transfer to industry and provide testwork, consultancy, analytical and mineralogical services to industry.

1.6.3 Mintek's Products and Services

Mintek's products and services encompass the following areas:

- Research and development, financed through a combination of public and private sources, parliamentary grant, competitive national and international sponsorship and internal reserves;
- Laboratory-, pilot- and demonstration scale testwork, for the purposes of developing and evaluating various technologies applied to new projects and optimisation of existing operations;
- Transferring innovative technology to industry by licensing, sale or in exchange for project equity;
- Design and fabrication of specialised plant and equipment for the minerals industry;
- Production and supply of specialised mineral and metal products; and
- Provision of specialised consultancy, training and advisory services to the minerals industry.

1.6.4 Client Base

Mintek's client base consists of other state enterprises, large multi-national mining companies (majors), junior resource companies, engineering contractors and SMMEs – both locally and internationally.

1.6.5 Competitors

Mintek operates in a global environment, servicing a multi-national industry. Therefore, clients have the option to source similar services from related facilities in Australia, Europe, Canada, Brazil, Chile, USA, China and Russia. The choice of institution is often based on the reputation of the technical experts and the quality of the facilities. Mintek has the competitive advantages of excellent, large-scale facilities, a reputation as a "one-stop shop" and an enormous information database developed during its 81 years of

operation. Mintek's greatest challenge is sourcing and retaining world-class expertise.

1.6.6 Business Environment

The global mining industry is experiencing an almost-unprecedented period of difficulty – mineral and metal demand has tumbled, metal prices are exceptionally low, grades are declining, costs are rising and stakeholder expectations are at odds with industry reality. China, the global mineral commodity growth engine, has reduced its demand in line with its shift from infrastructural investment to consumer-led growth. Project development pipelines, the key indicator of demand for Mintek's commercial services, are emptying rapidly. Exploration and project investment are at very low levels.

Industry consensus is that a recovery should become evident during 2017. However, it should be borne on mind that demand for Mintek services will lag this recovery by about 2 years, because initial attention will focus on reducing debt, and resuming deferred construction projects and brownfield expansions. Only after that will attention shift to new exploration and greenfield projects – those that require Mintek support services.

In short, the weakened demand for Mintek commercial services evident over the past few years is expected to continue for at least another year.

1.7 Corporate Plan

1.7.1 Mintek's corporate plan, incorporating its budget, strategic intent and financial plans, is submitted to the Executive Authority in terms of Section 52 of the PFMA.

1.7.2 Mintek's corporate plan including its goals and objectives are aligned with the strategic intent and will inform the direction for Mintek going forward.

1.7.3 The Shareholder will monitor Mintek's performance based on the strategic business targets set out in the Corporate Score Card Section.

1.8 Roles and Responsibilities

1.8.1 The Shareholder is empowered and hereby reserves the right to determine initiatives, projects or activities that Mintek shall undertake or become involved in, in the national interest, subject to the requirement that such activities shall:

- be funded from the parliamentary grant, and
- not prejudice Mintek's operations, financial health and ongoing viability as a going concern.

1.8.2 The key performance measures for Mintek, if necessary, shall be adjusted by the Shareholder to take into account Mintek's developmental role.

1.8.3 Any Developmental Projects determined in terms of clause 1.8.1 shall be deemed to have been approved in terms of Section 54 of the PFMA, and no further approval shall be required in respect of such projects.

1.8.4 A definition of what constitutes major Developmental Projects and the applicable criteria shall be developed by the Board and agreed to with the Shareholder prior to commencement of the project.

1.8.5 The Board and the Shareholder shall agree on an amount to be set aside for developmental projects.

1.8.6 The Board**:**

1.8.6.1 Is hereby mandated to oversee and to contribute to development of the strategic intent and furthermore to oversee the management of the business in accordance with such strategic intent, corporate plan, the Mineral Technology Act and any applicable legislation. The directors shall exercise their skill and fiduciary duties to ensure that management pursue the objectives and targets as set out in the corporate plan;

1.8.6.2 Commits itself to the achievement of the vision, mission, goals and objectives, and strategic intent of Mintek, and always acts within its powers and in the best interest of Mintek;

1.8.6.3 Accepts its responsibility to direct and guide the business in a proper manner in keeping with good governance practices, the PFMA, the Mineral Technology Act, the Shareholder Compact**,** and in particular, in compliance with the materiality framework agreed to with the Shareholder, which is annexed hereto as Appendix I; and

1.8.6.4 Recognises the importance of speedy decision-making and will use its best endeavours to prevent undue delays with regard to critical decisions.

1.8.7 Subsidiaries:

1.8.7.1 The performance of Mindev will be regulated by Mintek in its capacity as shareholder in line with the broad policy and direction from the Shareholder. Mintek shall enter into a Shareholder Compact with each of the main subsidiaries formed or to be formed, which Compacts shall be regarded by the Shareholder as compliance with the PFMA.

1.8.7.2 In addition, Mintek will ensure that Mindev and all its subsidiaries shall comply with the policies of the Shareholder, and that they adhere to acceptable governance practices in terms of reporting and accountability, as well as the materiality framework annexed as Appendix I.

1.9 Undertakings by the Shareholder

The Shareholder undertakes for the duration of this agreement not to:

1.9.1 Introduce new or additional requirements during the validity of this Compact other than through a process of consultation. Reasonable notice shall be provided before the introduction of any new or additional requirements. In addition, the parties shall, in such event, amend the key performance indicators and targets, failing which, no new requirements or targets may be introduced;

1.9.2 Impede or, in any way, restrict the discretion of the Board regarding matters falling within its authority, as provided for in this agreement;

1.9.3 Delay critical decisions or the proper constitution of the Board, and to fill vacancies that arise in the Board within a reasonable time; and,

1.9.4 Cause Mintek or any of its directors to breach any legal duty.

1.10 Mineral Technology Act

1.10.1 The Shareholder, in consultation with the Board, shall ensure that the Shareholder Compact and the Compact between Mintek and its subsidiary shall be consistent with the Mineral Technology Act of 1989 and the Memorandum and Articles of Association of any of the main subsidiaries.

1.10.2 In the event that there is any conflict between the provisions of this agreement and the Mineral Technology Act the provisions of the Act shall prevail.

2. SUBSIDIARIES – MINDEV

Mindev is a sole Mintek subsidiary that was first registered in 2001 with the aim of having a flexible entity that would facilitate joint ventures and/ or participation with various partners in order to optimise Mintek's technologies.

In line with the Companies Act, No. 71 of 2008, Mindev registered its Memorandum of Incorporation with the Companies and Intellectual Property Commission and was issued with a certificate of confirmation by the Commission in 2012.

Mindev has entered into various joint ventures over the years but is currently dormant from both an investment and operational perspective. The resultant effect of Mindev's prior years' net investment activities is that there are reserves of R39.5 million, currently represented as an interest free loan receivable from Mintek.

Mintek is still of the view that Mindev should be retained in order to maximise the commercial value of Mintek's fully developed technologies in the future. In each specific instance, the role of Mindev in maximising the commercial value of fully developed technologies will be reassessed at the appropriate time.

Mintek will continue to invest all Mindev funds and provide for all resultant taxes due on the interest earned. The entity will also comply with the applicable company legislation requirements.

3. PROGRAMMES

This describes the technical activities planned for each of Mintek's Strategic Business Units (SBUs). The activities are associated with either performing research and development, or providing products and services to the private sector.

The following are Mintek's programmes for the duration of this Shareholder Compact:

3.1 Technology

This programme consists of four Strategic Business Units that have a greater focus on commercial business compared to research programmes.

Hydrometallurgy is a collection of techniques for obtaining metals from their ores. It is a discipline within the field of extractive metallurgy involving the use of aqueous chemistry for the recovery of metals from ores, concentrates, and recycled or residual materials. The Hydrometallurgy Division (HMD) at Mintek leverages its unprecedented range of integrated test and pilot facilities as well as a high level of expertise to develop processing solutions for the minerals industry, primarily in South Africa, but also worldwide. This process development is supported by a broad in-house network of related disciplines such as minerals processing, pyrometallurgy and mineralogy as well as an extensive analytical facility.

The activities in the HMD are directed from a strategic point of view, by a number of high level imperatives which include:

- Sustainable development of South Africa's mineral wealth; and
- Development of novel technologies and process solutions to support and stimulate identified growth areas in the minerals industry.

In order to fulfil its mandate, HMD is broadly divided into leaching, solution concentration and purification as well as metal precipitation or electrowinning. Particular areas of expertise within these categories are pressure leaching, direct electrowinning, solvent extraction and ion exchange, process simulation as well as cyanide and arsenic speciation.

Although the development of processing technologies continues across the entire minerals industry from base metals through rare earths to precious metals, HMD currently focusses on the development of capacity in a number of key areas believed to be of strategic importance for the industry as well as the commercial sustainability of the Division and Mintek. These areas include:

- Gold processing (Current focus is on environmentally responsible gold tailings and reclamation projects. Recovery of gold from refractory ores using continuous pressure oxidation as one of the processing options);
- Cyanide management and recycling systems;
- Uranium processing (resin-in-pulp extraction, pressure oxidation of sulphide containing ores, high saline and high pH ion exchange recovery and direct precipitation, application of nano-filtration technology for the reagents recycling, uranium removal from acid mine drainage (AMD) waters, uranium recovery from Springbok Flats and Karoo sand deposit, additional value recovery like molybdenum in the case of Karoo deposit);
- Rare Earth Element extraction and refining (Process Simulator, Rare Earth ore cracking, REE concentrate purification and REE separation);
- Treatment of low grade high value streams (Ion exchange fibres and resins);
- Treatment of contaminated water and waste streams (SAVMIN™ and Ion Exchange fibres/resins, alternative adsorbents, research in direction of such contaminants removal as As, Se and Cr from AMD waters and industrial waste waters);
- Value recovery and stabilization of various mine dumps (jarosite, vanadium, thorium and uranium containing, etc.); and
- Optimisation of reagent utilisation, including reagent recovery and recycling in various processes.

The impact and acceptance of new technologies or products developed in HMD are normally maximised through partnerships with the industry. Examples of these are the demonstration of the MetRIX Resin-in-Pulp technology for uranium and base metals in collaboration with Tenova as well as the demonstration of the SAVMIN™ acid mine drainage treatment process in partnership with the world's largest water treatment company, Veolia.

More established products, such as the Minataur® gold refineries and the Nicksyn™ nickel and cobalt extraction synergist, are supported from HMD, while marketing and application of these products are done though collaboration with industry partners.

In summary therefore, HMD provides processing solutions for the promotion of sustainable exploitation of the mineral wealth in South Africa and globally by:

- Providing world class technical expertise and unparalleled test work facilities;
- Implementing, improving or adapting process flow sheets to suit clients' site-specific conditions; and
- Increasing process efficiencies resulting in increased viability of operations as well as reduced waste production and less environmental contamination.

Minerals Processing Division (MPD) comprises three specialist groups and a supporting operations group. The key specialist groups include Comminution, Physical Separation and Flotation that provides industry proven metallurgical solutions; recommending optimised process flowsheet design. Valuable minerals are beneficiated from ores by using comminution and various ore specific concentration processes. Key commodities that the group works on include Ferrous, Nonferrous, Platinum Group and Industrial Minerals. Depending on mineralogy and behaviour of the ore, separation can include size reduction, Sensor-sorting, gravity methods (spiral, jigs and dense media separation), magnetic separation or flotation techniques. Modelling and simulation of various process scenarios' using standard reconfigured empirical functions can also be conducted aiding in optimum flowsheet selection whilst reducing turnaround time for metallurgical testing.

MPD offers mineral process engineering solutions ranging from development of appropriate flow sheets based on bench scale test work (scoping and feasibility studies) through to pilot test campaigns (pre-feasibility and bankable studies). Optimisation of unit operations, plant auditing, evaluation of technologies, benchmarking and metallurgical industry standard tests are some of the key service offerings of the division.

Mineralogy and chemistry of ore bodies are essential tools in guiding the scope of work for selecting feasible process flowsheet options.

The Comminution Group focuses on development of total rock size reduction solutions for different ore types according to the client's needs. Comminution or crushing is normally carried out on "run-of-mine" ore, while grinding is usually conducted on dry or slurried material. A variety of bench-scale test facilities which include Bond Work Index Testing, JK Tech Testing, Advance Media Competency Tests, Grindmill and Stirredmill Tests for ore characterisation and pilot plants (comminution) for scale-up purposes are available. The group has extensive experience in applications such as High Pressure Grinding Rolls (HPGR), Semi-Autogeneous Grinding Mill (SAG), rod and ball milling and stirred media mills. The group offers solutions on model development, simulation of comminution circuits, plant survey and optimisation.

The Physical Separation Group offers solutions on various gravity separation techniques, magnetic and electrostatic separation processes. MPD has an in-house designed Mineral Density Separator (MDS) for predicting Dense Media Separation (DMS) and Jigging Plant performance in upgrading ferrous minerals such as iron, chromite and manganese ores. The modelling capabilities using the mineralogical Particle Tracking Analysis method has further supplemented the robustness of metallurgical process selection. With Iron ore and chromite being commodities with massive economic and strategic importance to SA over the longterm; the group has high level expertise in handling a wide spectrum of projects offering various need specific process solutions.

Physical Separation techniques are suitable for both fines and coarse processing to produce concentrate products at target specifications. In cases, where testwork has proven unsuccessful, data is simulated so that alternative processing options for the treatment of ore can be explored.

With the drive to reduce process energy and water consumption, ore sorting such as Optical, XRF and Near Infra-Red as a technique for upfront waste rejection off coarse run of mine feed sizes ranging between 150mm and 30mm have been extensively undertaken on ores such as chromite, PGM's (e.g. UG2) as well as Kimberlite and manganese.

The Flotation Group boasts a fully equipped laboratory facility as well as a range of modular pilot scale equipment and has vast experience with testing of PGM (Merensky/UG2) and Au ore. Also paramount is the technical ability to develop and evaluate flotation procedures for new ores, according to specific product grade and recovery requirements, by applying expertise on the selection of plant configuration, reagents, and processes, and by running extended pilot-scale testwork. The group conducts flotation testwork starting from laboratory, to Pre-feasibility studies (PFS), culminating in Definitive feasibility study (DFS) metallurgical testwork for clients in order to determine the ideal flowsheet design and operating conditions for producing final saleable concentrate.
A combination of Physical Separation and Flotation processes on certain Rare Earth Minerals has been demonstrated to significantly improve downstream leaching process economics as a pre-concentration step to remove gangue acid consumers. The group has over the years built experience and competency in the development of beneficiation routes for Phosphates originating from both Sedimentary deposits and Apatite having tested a vast range of African ores.

The Pyrometallurgy Division (PDD) aims to contribute to the growth of the South African minerals industry by providing technical support to industry via a range technology interventions and services. Technical support includes theoretical calculations, laboratory and pilot plant testwork as well as a wide range of consulting services including flowsheet development, feasibility studies and pyrometallurgical process consulting, training and development of tools and instrumentation. The aim is to facilitate optimum utilisation of existing operations and resources whilst continuing the development of more efficient high temperature processes. Pyrometallurgical processes are energy intensive by the very nature thereof and solutions to reduce energy consumption via more effective processing, or by supplementing electrical energy through other means (renewable energy for example) or pre-treatment as a means to reduce energy consumption in the smelting step, is a high priority research focus area for the division. All smelting processes in South Africa (PGMs, ferroalloys, ilmenite etc.) aim to optimise energy consumption both due to the scarcity and cost of energy. Unlocking previously unutilised resources through new technology and improved processes is another important focus area for the division as the demand for commodities continue to grow. More eco-efficient processes, which includes reducing emissions and minimising the impact on the environment underpins the research and development strategy of PDD ensuring the long term sustainability of the local metallurgical industry.

PDD operates two pilot-plant bays and various well-equipped high temperature laboratory areas. Bay 1 contains a variety of flexible research equipment, and Bay 2 is currently set up to operate a single large furnace for long-term demonstration-scale projects. The equipment housed in Bay 1 includes a variety of small furnace facilities with complete feed and product handling capabilities as well as several pre-treatment applications. The testwork facilities were developed based on the needs identified in industry during the late 70s and strong ties with industry remains to this day. The Bay 2 facility includes a water atomization system which was developed in partnership with Anglo American Platinum. This facility is ideally suited to demonstrate processes on a significant scale, often a key requirement to commercialisation of technologies.

The high temperature laboratory group offers a wide range of small-scale and fundamental studies by applying skills in mineralogy and experience in studying the products of pyrometallurgical systems which provides valuable complementary support for the pilot-scale, process modelling and development work conducted in the division. Equipment includes a range of muffle and tube furnaces, thermo-gravimetric analysers, batch rotary kilns, fluid beds and induction furnaces. Mintek's extensive mineralogical and analytical capacity is leveraged to provide high quality, technical investigations for clients when evaluating feed and products from all the testwork conducted in the division.

The pilot facilities at Mintek are unique and will remain a strategic strength for Mintek and the country and provide a unique opportunity for technology demonstration. In the medium term, PDD aims to grow the portfolio of service offerings aimed at assisting industry with current challenges specifically focussed on lower operating costs via improved refractory selections, optimisation of tap-hole and tapping practices, process control and metallurgical optimisation. These are areas in which PDD plans to contribute significantly via both services to industry as well as development of products. Two main areas of focus include developing methodologies to assist clients with selection of refractories and raw materials, like reductants and fluxes or binders. All high temperature processes are energy intensive and recovery of energy from products and wastes, as well as development of new greener technologies and applications, remain medium and long term targets.

Analytical Services Division (ASD) serves as a primary analytical facility in support of Mintek's core divisions. As Mintek operates in the mining research industry, analytical support is vital to the success of its operations. The division also has extensive experience with geochemical and metallurgical analysis and routinely gets projects and sample submissions from the industry for these kinds of analyses.

ASD is an ISO 17025 accredited laboratory, and was one of the first laboratories to be accredited in South Africa. In 2015, ASD celebrated 20 years as an accredited laboratory. Currently, the division has SANAS accredited methods in the following broad areas:

- The PGMs;
- Sample preparation (including ICP-OES, MS and AAs); and

- Wet Chemistry and XRF.

ASD is the official producer of the South African Reference Materials (SARM). These reference materials are produced to serve different sectors of the global resource, mining and metallurgical industries. The certification process for the SARMs involves different internationally accredited laboratories from around the world. From time to time, ASD is requested by clients to prepare and certify material to be used as Internal Reference Materials. These Internal Reference Material, are routinely used in the clients' QA/QC programs when dealing with external laboratories to assure quality of results.

To deliver the services, ASD has highly skilled and experienced senior staff who provide guidance and supervision in the running of the laboratory. The division is involved with on the job training of both Mintek bursars and work integrated learners who are able to graduate after going through the on-the-job training at Mintek.

ASD provides this specialised analytical service to the mineral, metallurgical and related industries, using state-of-the-art instrumentation for a variety of techniques, namely: AAs, ICP-OES, ICP-MS, XRF, Fire Assay and Wet chemistry. The division still maintains an extensive array of Classical Wet Chemistry analyses, including speciation of the common elements. The laboratory activities are managed by a LIMs system, which has been running in ASD for more than fifteen years.

The division started with the long overdue refurbishment of the building. The refurbishment includes:

- Upgrade of the building to allow for a simpler, better and faster sample flow. Glass partitions will allow for easy staff supervision.
- Upgrade of the Laboratory Information Management System (LIMS) which has been completed; and
- Replacement of old capital equipment with more modern equipment. This will ensure that the division retains its high service level.

3.2 Research and Development

This programme consists of five Strategic Business Units that have a greater focus on research and development rather than commercial programmes.

Advanced Materials Division (AMD) develops cost-effective metal-based materials through value-addition to South Africa's most strategic metals and minerals (precious, ferrous and base) for use in the fields of metallurgy, biomedical, catalysis and nanotechnology. The division has strong interactions with local and international higher education institutions, and mainly derives its human capital pipeline from various DST and the National Research Foundation (NRF) internship programmes. The division's revenue stream primarily emanates from large government-funded programmes, as well as from the provision of products and services to local and international clients.

The DST-funded programmes and projects hosted by the division are as follows:

- Advanced Metals Initiative – Under this initiative we have the:
  - Precious Metals Development Network hosted by the Catalysis Group with an emphasis to conduct pilot plant work and develop products in collaboration with end-users; and
  - Ferrous Metals Development Network (FMDN) hosted by the Physical Metallurgy Group. The FMDN undertakes research into durable and cost-effective materials for broader industrial applications.
- Centre of Competence in Hydrogen Catalysis (HySA/Catalysis) – The primary task of the HySA Catalysis Centre of Competence, which is jointly hosted by Mintek and the University of Cape Town (UCT), is to accelerate the establishment of a local value chain in the manufacturing of fuel cell catalysts, components and systems in collaboration with local and international industry partners.
- DST/Mintek Nanotechnology Innovation Centre (NIC) – The centre focuses on the development of nanostructures and their usage as systems or tools for therapeutics, water treatment and diagnostic purposes (e.g. developing electrochemical sensors and optical diagnostic devices).

A world-class clean room facility has been completed where nano-device prototypes and products will be manufactured for sale to customers and collaborators.

Science, Engineering and Technology Industry Internship Programme – This is a DST-funded Work Integrated Learnership which has been branded as the Science, Engineering and Technology Industry Internship Programme (SETIIP) where students from Universities of Technology are matched with relevant foundry and general engineering companies to enable them to gain experiential training and ultimately permanent employment in these industries.

All these programmes are focused on enabling the creation of new industries and improving the global competitiveness of existing industries in South Africa supported by a technologically evolved workforce.

The Physical Metallurgy Group is currently involved in the aluminium (thermo-mechanical and texture analysis) and precious metal (jewellery alloys) R&D programmes within AMD. It is also leading the technical assistance programme in collaboration with the National Foundry Technology Network (NFTN), an initiative funded by the Department of Trade and Industry (the dti), to assist the South African foundry industries and other non-ferrous companies.

In addition to a healthy income stream from R&D activities emanating from government-funded programmes, there is a major effort in the division to derive revenue from products and services that emanate from technical outcomes of various R&D programmes. The product and services activities in AMD include the following:

Metallurgical service work conducted under the Metals Technology Centre (MTC), which provides consulting and testing services to the metallurgical industry. It also provides consulting and technology assistance on corrosion, and foundry project work to local, Southern African Development Community and international clients;

- The marketing and selling of gold catalyst products (AuroLITE™ and AuroLITH™). To date, over ½ tonne of catalysts have been sold to 18 local and international customers. The Catalysis Group has also started marketing and selling Pt-based catalysts, albeit in gram (g) amounts at present;
- The MinNanogold™, MinDiagnostics™ and the MinPeptides™ products and services activities from the Nanotechnology Group; and
- The positioning of the Centre for Metal-based Drug Discovery (CMDD) to be the preferred provider of metal-based compounds that can be used for various applications including drug design and discovery, and a suite of services that include sample evaluation, development of assays, training and equipment usage.

The CMDD is also associated with the Medical Research Council driven Strategic Health Innovation Partnerships (SHIP) programme to further evaluate the library of developed compounds against TB and Malaria diseases. The objective is that should some of these compounds be found to be promising, further development will be conducted in collaboration with the MRC and other TB and Malaria global communities.

The Biotechnology Division (BIO) was originally founded for the development and transfer of bioleaching technologies of sulphide (i.e. deep-level) ores and concentrates bearing gold and base metals such as copper and nickel. As a result two commercial gold bioleaching plants have been licensed in Tasmania and China, a bioleaching pilot plant has been used to demonstrate the treatment of polymetallic concentrate in Mexico, and most recently the first bioleaching plant in the world for nickel extraction has been commissioned in Finland.

BIO has diversified into heap leaching, firstly as a laboratory testwork service supplier as part of which a large number of copper, uranium and nickel ores have passed through our laboratories during the past 15 years. Kipoi (DRC) and Tschudi (Namibia) are recent regional heap leaching projects for which the designs have been based on data generated in the Mintek heap leaching laboratories. BIO has also undertaken research into the advancement of heap leaching technology, culminating in a heap bioleaching pilot plant for the treatment of highly refractory copper ore in the mountains of the Kerman province in Iran. The skills and capabilities of the division are also now being applied to the treatment of mine effluents and extracting value from mine dumps with primarily South African application, while collaborative links are being maintained with European consortium partners on these topics to maximise mutual benefit.

Measurement and Control Division (MaC) plays a critical role in the minerals beneficiation value chain by providing measurement and control technologies that strive to ensure that industrial minerals processing, hydrometallurgical, and smelting plants operate efficiently and effectively under varying ore and plant conditions. MaC has developed and commercialised a number of niche measurement instruments for the gold, ferroalloy, and PGM industries to provide both process and environmental monitoring capabilities upon which control systems can be designed and implemented. The most notable of these instruments is the Cynoprobe, an online, in-pulp cyanide measurement instrument that is used by gold leach plants to both optimise the dosage of cyanide into the gold leach tanks to ensure the gold is leached effectively, and at the tail-end of the process to monitor the cyanide levels in effluent streams to ensure compliance with environmental guidelines. Mintek has sold well over 100 of these instruments to over 20 countries, primarily South Africa and other Africa countries. In addition to the Cynoprobe, MaC has recently added an ultrasonic-based carbon concentration meter, the C² Meter, to its suite of gold-process measurement instruments. The C² Meter was only commercialised at the end of 2014, and to date over 30 units have already been sold. Industrial tests at a local gold producer showed reduction in soluble gold loss of up to 40% through the proper measurement and control of the carbon in the gold leach circuit. In 2015/16 good progress was made towards producing a low cost version of the Cynoprobe, which will make this technology more accessible to smaller producers, and in so doing, assist the cost competitiveness of these producers while enabling them to monitor and minimise their environmental impact.

The first steps towards including model predictive control, a highly sophisticated control technology, directly on the Cynoprobe were also made during 2015/16. The objective is to finalise and commercialise these two significant developments in the 2016/17 year. The C² Meter will also undergo many cost cutting refinements in 2016/17 to make these instruments more accessible to gold producers too.

The second major focus area for the MaC division is the development and application of advanced process control (APC) technologies. In many respects, the division is the leader in the field of APC for minerals processing. The division's flagship control systems: FloatStar, MillStar, FurnStar, and LeachStar, are regularly shown to improve plant recovery by in excess of 2%. This results in payback periods of as little as 3 months in some cases. The challenge with most modern control systems is that they rely on a mathematical model of the plant to determine and predict what effect control actions will have on the plant. The problem is that the models are never perfect, and plant conditions and responses change. A manual remodelling process is therefore required periodically to ensure the control system continues to operate effectively. In response, Mintek recently developed an "Automodeller" tool that is able to inject signals into the plant, while still under control, to extract a model of the plant without the need for any manual process. This means the modelling process can be run more frequently and for longer periods, unattended, to get better, more accurate models and ensure the control system continues to operate effectively. This is a major breakthrough in the application of APC, and in recognition, the technology was awarded Mintek's prestigious APEX award in 2015/16. In 2016/17 this cutting edge development will continue towards being able to provide plant-wide optimisation. The models that the Automodeller produces can be used to determine the optimum steady-

state operating point of the process – a technique termed real-time optimisation. Here the control system is able to determine where it needs to compromise in order to get the best performance from the system as a whole. Traditionally control systems rely on the metallurgist or operator to specify the setpoints to which the controller must control, but these are rarely adjusted, and often result in the plant being run sub-optimally when conditions change or disruptions occur. With the real-time optimiser, these setpoints will automatically be determined by the control system to provide optimal overall performance.

In addition to the development of its core process control technologies, MaC will also be seeking to apply these technologies to new processes in the 2016/17 financial year. The target is to produce a prototype control system for gravity spiral concentrators, a critical process unit in mineral sands and chromite beneficiation processes. The division also seeks to apply its Robust Non-linear Model Predictive (RNMPC) control technology together with the Automodeller on Dense Medium Separator (DMS) process units which are used in the coal and diamond beneficiation processes.

Mineralogy (MNL) is expanding its services by conducting research at applying geometallurgical concepts to ores from the Platreef, and builds on knowledge from industry. Success on this work will enable similar concepts to be marketed to other mining companies that are mining the Platreef. On this project MNL is in a three year collaborative project with five German institutions. As a partner in this collaboration, Mintek will be privy to more cutting edge characterisation and modelling techniques used by its German partners.

Mintek's Mineralogy Provenance Laboratory was established together with the SADPMR in 2009 to undertake diamond fingerprinting analysis to establish if diamonds from different sources are geochemically distinct. The fingerprinting technique involves stereomicroscopy, FTIR and LA-ICP-MS. In the past diamond parcels were obtained through sponsors and most recently through the KP. Diamonds from the CAR were recently fingerprinted. This research work will continue at Mintek through obtaining diamond parcels from the KP. Further, diamonds are expected from the neighbouring diamond producing countries to build a database of diamonds in the SADC region.

Building capacity in the area of diamond fingerprinting, which only a handful of laboratories have attempted. To date, nobody is known to have established an internationally-accepted method for diamond fingerprinting in assisting the Kimberley Process Certification Scheme to stem the flow of conflict diamonds. This ongoing research is mandated to KP participants by the UN Security Council. The division is also conducting research on coltan, cassiterite and wolframite analysis for fingerprinting purposes in collaboration with BGR – German Science Council. Mintek is currently the only laboratory on the African continent to be conducting such work.

Calibration materials for the LA-ICP-MS are required to meet two physical properties: homogeneity on the micro-scale and being matrix matched. Current standards do not meet both these requirements and often more than one standard is used for one set of analyses. Production of nanoparticulate calibration standards, if successful, would fill a gap in the accuracy of calibration standards currently used in the LA-ICP-MS community.

Over the last few years, large-scale improvements in contrast and resolution have been made by various suppliers to the 3D industry, resulting in the ability to successfully image geological and metallurgical products. It has been demonstrated that XCT has advantages in speed and cost over traditional 2D methods of analysis at Mintek (XCT workshop, 21 October 2014). Quality is the area of research focus that will allow XCT to supersede 2D analysis. The focus on this research will be on image analysis for particle segmentation, which is key to particle analysis, and hence liberation studies. Mintek thus needs to develop within this sphere to ultimately hold a competitive edge in 3D applications for metallurgical processing. Strategic relationship with the Stellenbosch XCT scanning facility will strengthen Mintek's profile in this field.

The **Small Scale Mining and Beneficiation Division (SSMB)** has developed expertise in supporting existing and potential small, micro, medium enterprises (SMME's) in the minerals sector. Mining, metallurgical and infrastructural support for SMMEs with respect to downstream beneficiation of minerals is also undertaken by SSMB. This is a programme under which SSMB offers technical support and assistance to small enterprises with no access to in-house consultants and limited financial resources. Other areas covered are extractive technologies in mining on a small scale, beneficiation of resources, sustainability and environmental matters and training.

SSMB plays a critical role in fulfilling national priorities relating to advancing both the rural and marginalised communities within South Africa, and promoting mineral beneficiation. Skills development is a key national priority and therefore presents numerous opportunities for the division to provide quality training. The programmes that are a vehicle for economic development, job creation, poverty alleviation and upliftment of both women and unemployed youth include jewellery, semi-precious gemstones, glass beads and pottery manufacturing.

This year SSMB will focus on:

- Continued technical assistance and support to the semi-precious gemstone training and beneficiation centres in Prieska and Upington in the Northern Cape;
- Implementation of the marketing and branding strategy for the products developed by SMME's within rural communities;
- Continued monitoring and evaluation of SMME's to ensure sustainability;
- Intensifying activities within the ceramic, jewellery and recycled glass beads/slumping programmes to enhance the beneficiation of minerals to stimulate sustainable livelihoods in local poverty nodes within South Africa;

- The development and adaptation of technologies for small scale operators related to energy efficiency, water purification, recycling and beneficiation of mine waste; and
- Developing new training programmes under the Mining Qualifications Authority (MQA) and other relevant SETA's.

3.3 Business Development

Business Development functions include the following:

- Monitoring strategic trends in the local and international mining industry, with particular emphasis on innovation needs, and updating the Board, Executive and Management appropriately.
- Providing support to Mintek's operating business units related to market intelligence, marketing support and the management and commercialisation of intellectual property.
- Playing a key role in coordinating research at national level, which creates coherence and synchrony with other science councils, universities and the mining community.

Mineral Economics and Strategy Unit (MESU) provides insight and business intelligence into all parts of the mining and minerals value chain. Outputs include mineral economics assessments, supply/value chain assessments, statistical analysis and forecasting, second economy interventions related to the minerals sector and environmental sustainability assessments.

MESU also has competence in facilitating the rehabilitation of derelict and ownerless mines, and is responsible for implementing rehabilitation programmes as agreed between the DMR and Mintek from time to time.

Marketing: Mintek sells a range of metallurgical services, technologies, and plant equipment to the minerals industry worldwide. The nature of this commercial activity demands direct interaction between the client and the appropriate technical specialists ultimately providing the service. Much of Mintek's business is derived from repeat clients and maintaining their loyalty is of paramount importance. Creating market awareness of products to new clients is created via the presentation of quality papers at conferences and publishing of technical papers in credible journals.
For this reason, Mintek employs a decentralised marketing model, with a small measure of central coordination and support which is offered by the Business Development section. Mintek's business units are thus largely responsible for marketing their own products and services.

Mintek Office of Technology Transfer: Mintek is required, in terms of the IPR-PFRD Act, to maintain an office for technology transfer. This function falls under MESU, and the group ensures that publically-funded IP is recorded, properly exploited and reported to NIPMO. The office also provides IP advice to the business units, interfaces with external IP attorneys and maintains the register of Mintek IP.

3.4 Corporate Services

Corporate Services currently gives strategic and operational support to all of Mintek divisions in the following areas:

- Corporate Governance and Organisational Compliance;
- Human Resources Management, Training and Skills Development;
- Information and Communications Services; and
- Library and Knowledge Management.

Corporate governance and organisational compliance are extremely important aspects of organisations and Corporate Services is tasked with ensuring that Mintek is a good corporate citizen that is fully compliant with all the applicable laws and governance standards. To this end, Corporate Services ensures that the Board is given the necessary support to enable it to discharge its duties efficiently and effectively in line with the required fiduciary duties enunciated mainly in the Public Finance Management Act, Treasury regulations and the Minerals Technology Act.

Corporate Services will continue to carry out the responsibility of ensuring that Mintek meets its obligations to the DMR as the executive authority, and fulfil its reporting obligations to Parliament of the Republic of South Africa and other key stakeholders. The responsibilities are carried out through two support divisions (a) Human Resources Division and (b) Information and Communications Division.

3.4.1 Human Resources Division

The Human Resources Division (HRD) is a strategic business partner to Mintek Divisions that provides advice and support on people-related issues impacting on productivity, profitability and sustainability, while ensuring that the well-being of employees. The work of HRD is organised into three strategic programmes, namely:

- Recruitment, training and skills development;
- Employee relation, health and wellness; and
- Human resource management and administrative systems.

The *Recruitment, Training and Skills Development Programme* entails all activities related to the on-boarding of employees and development initiatives undertaken for continuous professional improvement. The recruitment arm is geared towards addressing short, medium and long term human capital requirements of Mintek. Succession planning and retention strategies support the medium to long-term requirements, while the short term needs are met through recruitment drives for specific positions as they become vacant. Mintek also maintains a talent pipeline through a full-time study bursary scheme, which ensures a steady flow of young graduates into the organisation.

The training and skills development arm has two categories of human capital development initiatives that are undertaken. The first category includes Mintek's contribution to the country's human capital in the mineral and metallurgical resources sector. In pursuit of this goal, Mintek participates actively in the promotion of Science,

Engineering, Technology, Mathematics and Innovation (STEMI) as fields of study that are essential in creating a human capital base. Mintek has firmly established itself in the calendar of STEMI promotion the *Minquiz* initiative, and will continue to do so in the current financial year.

There are significant partnerships that have been established with Higher Education Institutions (HEIs) as part of this programme and Mintek will continue to extend partnerships to previously disadvantaged HEIs in order to increase the pool of previously disadvantaged students that can specialize in our area of operation. Initiatives undertaken in this category are of benefit, not only to Mintek, but to the country as a whole. Mintek also partners with a number of state institutions in human capital development, including the Mining Qualifications Authority (MQA), the DST, and the NRF. In these partnerships, Mintek either provides funding by means of bursaries and scholarships, or on-the-job training and structured learning in a workplace environment.

The second category of human capital development initiatives focuses internally on Mintek staff. The intention is to ensure that Mintek retains its credibility as a science council that is innovative and leads knowledge production in relation to minerals technologies. . As the current contingent of researchers and scientists age, it is important to retain a steady stream of new entrants to ensure that the age profile maintains a healthy balance in terms of length of experience on the one hand, and age on the other hand in an integrated way. Mintek is also focused on rectifying traditional gender imbalances in the STEM field by recruitment and development of women in line with the economically active population demographics.

One of the most successful programmes is Mintek's Graduate Development Programme (GDP) through which recent graduates in science and engineering are taken through a structured learning programme that is both educative and experiential. The implementation of the GDP will continue in the next few years as the programme has gained momentum, although it will continue in a revised format that has been designed to align with Mintek's performance management cycle. By the end of the programme, participants emerge as well-rounded professionals in mineral and metallurgical processing.

This programme also includes an area that deals with organisational capacity and addresses issues relating to attracting, motivating and retaining staff, as well as organisational performance management. Mintek places a lot of emphasis on retaining staff that is motivated, while also maintaining a performance culture that rewards top performance and innovation, in keeping with Mintek's mandate as a science council. One of the successful initiatives that bring out top, competitive performance from researchers is the annual Apex awards, which recognizes and rewards technological innovation and excellence.

The *Human Resource Management and Administrative Systems programme* aims to provide effective HR administration and information. The programme has been focusing on a progressive migration of business processes from manual to electronic systems in the last two years, and will continue for the next three years. The main objective for automating business processes is to improve efficiencies and allow human resource practitioners to dedicate valuable time on providing strategic business advice to divisions instead of pushing paper. The time and attendance system implemented in the previous financial year is already showing results in planning and allocation of available resources to optimise productivity. In the next three years, business process improvement will continue through the automation of other critical processes that are in the three-year HR plan.

The *Employee Relations, Health and Wellness Programme* focuses on maintaining a harmonious working relationship between the employer and its employees. The company's labour relations policies such the Code of Conduct and Business Ethics and the Disciplinary Code assist in enlightening the stakeholders on how to engage with one another. Training of staff and managers in labour relations matters is provided on a continuous basis. In order to further enhance the knowledge and skills of Mintek staff, all employees are issued with an employee relations manual on induction.

The programme also includes an Employee Wellness Programme, as well as Occupational Health and Safety and wellbeing of employees that is managed by our Clinic staff. Mintek is committed to conducting HIV/AIDS screening sessions to mitigate the overall impact of the scourge on the organisation and to give support to employees affected by the disease. Information sessions and events will continue to be hosted regularly to educate employees on various occupational and primary health issues and screening events will continue on a regular basis.

Mintek submitted an Employment Equity Plan for 2015-2018 to the Department of Labour. This will be implemented as set out in the Employment Equity Act. Overall, Mintek aims to achieve a demographic profile that is comparable to that of the country in relation to population group, gender and people living with disability. The Board continuously monitors Mintek's performance in this regard. Our overall employment equity target of 90% has not been achieved although we are tracking close at 88%. Efforts to improve on this metric will continue.

3.4.2 Information and Communications Division

Information and Communications Division (IAC) at Mintek comprises the Library and Knowledge Management Services, Conferencing and Events, and Communications. The primary objective of IAC is to provide strategic information and communication services to Mintek.

IAC focuses on areas of corporate governance and compliance, and supports the Mintek Board in providing company secretariat services. This includes advising the Board and its Committees on various aspects of the Board's work as well as updating matters of the Board as required from time to time.

The *Library and Knowledge Management unit* is responsible for providing Mintek's researchers with critical scientific and technical information in support of Mintek's business

requirements. This includes the collection, organisation, retrieval and dissemination of information that ultimately adds value by meeting Mintek's high-level objectives of knowledge production and dissemination, innovation of new products/services and improved business process and procedures.

In maintaining and protecting Mintek's IP, the management of Mintek's IP and corporate memory which forms the basis of Mintek's vast knowledge base is done through developing electronic catalogue collection of the holdings using a library management system. This contributes to the patenting process by searching for prior art using sophisticated information resources, and ensuring that Mintek researchers remain in the forefront of their specialist areas by providing access to internationally recognised databases in full-text. In addition to the above, the unit ensures that work of potentially commercial value is protected through patenting and maintenance of such records.

The *Communications Unit* has a conferencing and events section that enhances Mintek's competitive position and strives to be the best choice of clients, mainly Mintek technical divisions, by helping to ease their event and conference planning burden. Some of the specific functions carried out by this unit includes organising site visits, exhibitions and trade fairs, corporate social investment events, colloquia, workshops, open days, and consumer education programmes for Mintek and various external clients.

The *Communications Unit* offers a wide range of strategic, corporate, marketing and media communications and support services to the business-oriented divisions. In so doing, the unit contributes to the successful delivery of Mintek's mandate by guaranteeing that correct communication and messages are delivered to various audiences as required. The unit also manages the content of the Mintek corporate website. The webpage serves as a portal for continuous engagement with external stakeholders. Mintek's major external communications include the statutory Annual Report and Quarterly Reports to the DMR.

Mintek's communications plan is aimed at supporting the organisation's overall objective of maintaining its position as one of the world's leading mineral technology research and development organisations. Communication materials are produced digitally and in a lesser number, in printed format, and are aimed at a wide range of target audiences locally, nationally and internationally.

IAC informs Mintek staff of the latest developments in the organisation including news, forthcoming events, on-site services, policies and procedures. Daily staff announcements are communicated through e-mail with urgent announcements communicated instantaneously through newsflashes. Mintek News is a monthly staff newsletter which is also distributed to Board members and internal stakeholders. Information on services to staff, policies and procedures, health and safety as well as Staff Association matters are also hosted on the corporate intranet website.

3.5 Internal Audit

Internal Audit is an independent, objective assurance and consulting activity established in terms of Section 51(1)(a)(ii) of the Public Finance Management Act No. 1 of 1999, as amended. Internal Audit adds value by enriching Mintek's operations through advice derived from its evaluation and assessment of Mintek's work during the course of the year. It also helps Mintek accomplish its objective by bringing a system driven, disciplined approach to evaluate and improve the effectiveness of risk management, control and governance process.

The Executive Committee of Mintek has tasked the Internal Audit section to increase focus on Information Technology audits with a view to assist the IT division to reduce the number of findings identified by AGSA. In this regard, the Internal Audit section is in the processing of capacitating itself. To this end, and part of collaborations between Internal Audit and AGSA, there are discussions taking place between Internal Audit and AGSA with regard to AGSA assisting with capacitating Internal Audit with IT audit skills. Furthermore, Internal Audit will continue to identify suitable programmes which may assist in accelerating skills in the IT auditing competency.

3.6 Finance Group

The Programme comprises four main components; namely, Finance, Supply Chain Management, Information Technology Services and Engineering and Maintenance Services. The programme provides a support service and creates an enabling environment to all other divisions within Mintek.

Finance Division provides a broad range of different services to meet corporate, statutory, and compliance requirements. They provide transactional, administrative and professional services to the business, and deliver financial and management reporting and value add decision support. The main activities of the division include: budget control, internal control management, revenue and expenditure management and accounting system management.

The division will amongst others focus on the following:

- Further improvement of efficiency and turnaround times in processing of routine transaction through use of technology;
- Provision of planning and decision support to create value for Mintek through automation of monthly reporting; and
- Enhancement of processes to strengthen internal controls.

Information Technology Services (ITS) ensures that Mintek's IT infrastructure and systems remains available to Mintek's users. Typical IT-related processes and functions include backing up of data, virus protection, providing remote access to mobile users, internet access, office utilities (e.g. word processing and spreadsheets), and electronic mail. The ITS division also provide support for specialised

systems, including SAP (ERP system) and LIMS (laboratory information management system).

During the year, ITS will be working on the following projects, some of which are carried over from the previous year:

- Increasing the value of Mintek's SAP system to business through:
  - Implementation of Employee Self Service
  - Development of new SAP Business Warehouse reports
- Establishment of a high availability data centre Development of various SharePoint based processes, e.g. SHEQ management, document and records management;
- Implementation of System Centre Operations Manager for improved monitoring and management of Mintek's ICT infrastructure; and
- Server virtualisation and virtual LAN infrastructure establishment.

Mintek's ITS Section is in the process of refining ICT governance processes as required by the Department of Service Administration's Corporate Governance of ICT Framework. This also requires the previously established IT System Master Plan to be reviewed and enhanced in order for the new ICT governance requirements to be met.

Engineering and Maintenance Services (EMS) is responsible for the management and maintenance of Mintek facilities and other assets of Mintek. The services include basic maintenance service, electrical and instrumentation, building maintenance (including the laboratories) and mechanical maintenance (Drainage, Effluent, Bays, Mobile Equipment and Mechanical Equipment).

The focus for this business unit has shifted from a division that effectively supports the needs of the SBU's to introducing processes and systems that will enable detection of deficiencies and substandard performance. These will include optimisation of preventive maintenance systems, active energy monitoring and control, creation and documenting the project management system for the division. The implementation of the SAP PM module now ensures improvement in overall execution and performance of maintenance services in EMS. The further focus on efficiency will induce improved delivery and human resource performance.

Upgrade of existing infrastructure and development of new infrastructure (where required) will continue to form the greater part of the divisions function as Mintek continues to embark on the improvement of the facilities to return them to modern and world class status. Such upgrades include the mapping of services, upgrade of security systems, modernisation through procurement of tools and equipment and the upgrading of buildings and facilities, etc.

The **Supply Chain Management (SCM)** unit is primarily responsible for the provisioning of products and services to sustain Mintek's business operations. It consists of procurement, vendor & tender administration, fixed assets and inventory management.

SCM assists business units with sourcing and the identification of suitable suppliers, the request-for-quotation process, the evaluation of quotations and vendor selection. Vendors for high value products and services are selected by way of a tender process. Stock of operational supplies and consumables are kept to minimise supply delays.

During the year SCM plans to introduce the following initiatives:

- Improving demand planning which is achieved through stakeholder engagement, involvement in the budgetary process and obtaining a 12-18-month plan and requirements from end users;
- Improving supplier relationship management through monitoring of supplier performance by implementing service level agreements with critical suppliers as well as supplier performance evaluation and the improvement of contract management. This will be achieved through the optimisation and utilisation of the contract management module on SAP;
- Establishment of processes to ensure regulatory compliance; and
- Continuation to emphasise the importance of asset management. More asset verifications will be conducted to improve control over the movements of assets. Asset movement will be automated through SharePoint.

4. SAFETY, HEALTH, ENVIRONMENT, QUALITY AND RADIATION PROTECTION PLAN (SHEQ-RP) PROGRAMMES

The Safety, Health, Environment and Quality (SHEQ) unit is responsible for ensuring that Mintek complies with SHEQ-PR legal requirements and maintains its SHEQ accreditation status. The ISO9001, ISO17025, ISO14001 and OHSAS18001 SHEQ internationally accepted management systems have been implemented and entrenched in the organisation throughout the years, ensuring the implementation and effectiveness of the SHEQ-RP policy and plan. The key focus areas of the plan are to:

- Prevent fatalities and eliminate safety, health and environmental incidents and accidents;
- Ensure at all times that staff is competent and trained to meet Mintek's objectives;
- Deliver on time quality products and services;
- Identify, eliminate and manage business and safety, health and environmental risks, hazards and aspects;
- Ensure that our activities, as well as those of our suppliers and clients do not cause environmental pollution or degradation; and
- Comply with the regulations, legislation and conventions that affect SHEQ-RP.

Mintek is audited annually by accredited independent external auditors to determine whether we are meeting our targets and adhering to the ISO standards. In August 2015 Mintek successfully passed its recertification audit. In the next two years focus will be preparing Mintek to comply with the new ISO9001:2015 and ISO14001:2015 standards.

5. FINANCIAL PLANNING

5.1 Consolidated Budget – 2016/17 to 2018/19

The consolidated budget for the 2016/17 financial year is presented below. Total expected income is R537 million, 53% of which is state grant. The high ratio of the state grant revenue is mainly due to R108 million MTEF revenue that will be generated in the financial year. However, this MTEF allocation is project-based and as a result it might not extend to other years. The consolidated budget shows positive net results coming mainly from the commercial activities of the organisation although the international economic outlook is fairly bleak. The table should be read together with the State grant reconciliation table which reconcile the figures as per the Adjusted Estimates of National Expenditure (AENE) document including all MTEF allocations and the spending in the same period.

Table 1. Income and Expenditure Budget (R'000)

Income ['000 Rand]	2015/2016 Forecast	2016/2017	2017/2018	2018/2019
State grant	282 289	288 096	281 599	271 236
Contracted research	45 024	42 258	43 103	43 965
Products and services	185 277	179 958	185 357	192 772
Sundry Income	25 168	27 006	27 547	28 098
Total Income	**537 758**	**537 319**	**537 606**	**536 071**
Expenditure ['000 Rand]	**2015/2016 Forecast**	**2016/2017**	**2017/2018**	**2018/2019**
Staff Costs	308 861	312 926	319 185	322 377
Bursaries	15 188	13 294	13 560	13 831
Operating costs	182 553	184 308	187 994	181 754
Depreciation	16 766	15 501	15 656	15 813
Total Expenditure	**523 368**	**526 030**	**536 396**	**533 775**
Net result	**14 391**	**11 288**	**1 210**	**2 295**

5.2. Capital Investment Plan

The table below (table 2) illustrate the Capex budget for the MTEF period from the anticipated funding sources. Mintek will continue the investment on capital expenditure averaging at R39million annually and 40% of the total Capex will be from the MTEF funding while the balance comes from reserves and state grant allocation. Funding from reserves will increase as MTEF funding decreases over the coming three years.

Table 2. Capital Expenditure Budget (R'000)

Capital expenditure budget ['000 Rand]	2015/2016 Forecast	2016/2017	2017/2018	2018/2019
State grant - capital allocation	17 786	17 744	18 713	19 844
Other funding - capital allocation	-	1 200	-	-
MTEF funding - capital allocation	26 793	15 161	8 772	3 190
Capex funded from reserves	795	4 976	12 769	18 428
Total Expenditure	**45 375**	**39 082**	**40 254**	**41 462**

5.3. State Grant allocation

Mintek has two main sources of funding for its long-term research programme – Baseline State Grant (Science Vote) and MTEF allocations. Wherever possible, additional funding is leveraged from private companies and international agencies. Mintek funds its early stage research from baseline science vote and largely utilises the MTEF funding for specific later stage development activities.

Mintek's R&D programme is structured into various platforms or themes. These themes are determined according to (a) government priorities and (b) industry needs and opportunities. A structured, rigorous process is applied in determining budget allocation between the themes, initiating research project opportunities within these themes, stopping projects that do not deliver the desired results and re-allocating the budget where necessary. The annual process of allocating state grant is very extensive and involves consideration of progress and outputs of all current projects. In an effort to ensure that the priorities are addressed the grant is re-allocated between the clusters as can be seen in the tables 3 and 4 below.

Mintek's key performance areas and research and development clusters are also highlighted for reference. The budget values shown exclude value added tax (VAT), the administration fee, and the capital transfers. It can be seen from the table that the State Grant is allocated in accordance with Mintek's Mandate and Mission; namely, to develop mineral processing technologies and products/services derived therefrom, play a significant role in interventions in marginalized Communities, and in organisational development. Mintek supports the mineral strategies and initiatives of the Department of Mineral Resources. The DMR has identified 10 commodities and 5 value chains as priorities for beneficiation and value creation. Mintek uses these identified priorities as a basis for deciding on technical programmes. Mintek's R&D plans and activities are thus fully aligned with DMR priorities.

The state grant allocation for the financial year 2016/2017 is presented below in broad categories or themes, namely, Mintek's Strategic Business Units, Strategic Goals, Research and Development Clusters, and per Commodity.

The allocation trends in the table below shows a steady increase in science vote allocation to precious metal (PM) and Eco-Efficiency (EE) cluster due to the strategic focus the organisation decided to take and also due to abundance of precious metals within South Africa. Eco-efficiency deals with greening of our technologies. There is a reduction in base metal (BM) allocation and this will continue until we reach the 5% mark. The reason why this is reduced is because primary base metal production in South Africa is derived mostly as by-products of the PGM industry. We will continue to allocate science vote funding to BM cluster because the value to South Africa of the primary base metals industries it is in our immediate Southern African neighbouring countries which has a direct economic impact on South Africa. The rest of the clusters allocation will remain the same.

MTEF allocations

In contrast to the State Grant allocations, the MTEF projects are motivated to Treasury for specific project activities. These project proposals are based on successful early stage research funded from the State Grant and where there is close alignment with Government priorities. Once a project has been accepted by Treasury, operational management and oversight of the project is undertaken by the same team that manages the allocation and oversight of the State Grant research funds.

Because MTEF applications are closely aligned to Mintek's State Grant research areas, there is similarity between the areas being researched, although the MTEF funds are used to undertake later stage development of promising research ideas. Currently the main areas of MTEF research are:

- Job creation and poverty alleviation. For example the current project in the Northern Cape where unemployed people are trained to beneficiate local gemstones.
- Eco efficiency. This includes activities associated with energy efficiency, water efficiency and recycling/treatment.
- Urban mining. Recycling of waste (e.g. electronic waste) and processing of old mine dumps are some on the projects included here.
- Application of sensor based sorting to low grade coal deposits with the aim of rendering them suitable for use in Eskom power plants.
- Beneficiation of South African ores. For example the development of the rare earth element refining pilot plant with a view to stimulate the development of a rare earth element production and manufacturing industry in South Africa.

Table 3: State grant allocations per Mintek's Strategic Business Units and cluster allocations, 2016/2017 (R,000)

Strategic Objective		AMD	ASD	BIO	EMS	HMD	MAC	MESU	MNL	MPD	PDD	SSMB	Corp	Total
Research and develop efficient mineral processing technologies and value added products and services	Precious Metals	154	3 187	1 562	451	6 413	8 852	11	6 075	4 543	2 409	-	-	33 657
	Base Metals	-	138	3 080	-	3 603	660	495	110	55	660	-	-	8 800
	Energy Minerals	-	1 733	2 173	275	7 238	330	-	1 122	3 190	1 320	-	-	17 380
	Mineral Beneficiation	16 687	237	-	259	-	-	220	-	-	2 453	-	-	19 855
	Ferrous Minerals	2 699	726	407	110	220	2 090	110	1 188	4 587	4 697	-	-	16 834
	Sub total													
Research and develop efficient mineral processing technologies and value added products and services	Eco Efficiency	1 210	3 960	8 701	770	10 082	3 405	64 295	3 630	24 595	20 933	2 200	-	143 780
Promote the mineral-based economies of rural and marginalised communities	Small scale	-	22	-	-	-	-	-	22	-	22	13 354	-	13 420
Develop human capital and organisational skills to build world class R&D excellence	Strategy and capacity	-	-	-	-	-	2 090	2 310	-	-	-	-	11 270	15 670
	Provision	4 400	1 100	330	-	1 540	-	2 200	2 200	3 300	330	3 300	-	18 700
	TOTAL	25 150	11 101	16 253	1 865	29 095	17 426	69 641	14 347	40 270	32 824	18 854	11 270	288 096

5.4. State Grant Reconciliation

Table 4 below shows a reconciliation of all allocations as per the Adjusted Estimates of National Expenditure (AENE) document and the Mintek budget.

Table 4

State grant reconciliation	2015/2016 Forecast	2016/2017	2017/2018	2018/2019
Available allocation CASH	414 742	371 416	367 256	350 368
less VAT	50 933	45 612	45 102	43 028
Amount excluding VAT	363 809	325 804	322 154	307 340
less capex	44 580	32 906	27 485	23 034
State grant - capital allocation	17 786	17 744	18 713	19 844
MTEF funding - capital allocation	26 793	15 161	8 772	3 190
Available state grant revenue	**319 229**	**292 898**	**294 670**	**284 306**
MTEF				
Northern Cape Precious gemstones	6 270	-	-	-
Waste and scrap reprocessing/Urban mining	30 000	-	-	-
Sensor based sorting	15 000	-	-	-
Water Efficiency: waterless mineral processing	20 000	20 000	15 000	-
Energy Efficiency: reduced energy in comminution and smelting	20 000	24 000	15 000	-
Environmental impact: technology to minimise mine discharges	15 000	15 000	10 000	-
Waste and residue recycling: mining waste dump reprocessing	15 000	15 000	10 000	-
Titaniferous Magnetite			5 000	20 000
D&O	84 000	60 000	62 696	66 622
SAVMIN	5 730	-	-	-
Total	**211 000**	**134 000**	**117 696**	**86 622**
less VAT	25 912	16 456	14 454	10 638
Available MTEF	185 088	117 544	103 242	75 984
MTEF funding - current allocation	141 468	91 697	47 209	-
MTEF funding - capital allocation	26 793	15 161	8 772	3 190
Admin fee at 10%	16 826	10 686	5 598	319
Available MTEF	**185 088**	**117 544**	**61 579**	**3 509**
Available state grant revenue	**319 229**	**292 898**	**294 670**	**284 306**
MTEF funding - current allocation not classified as revenue	-11 400	-13 070	-13 070	-13 070
Carry over MTEF from previous financial year		8 268		
Carry over MTEF to next financial year	-25 540	-		
Total state grant revenue	**282 289**	**288 096**	**281 599**	**271 236**

5.5. Allocation of other Government Grants

In terms of a contract with the DMR signed in June 2013 Mintek is managing the rehabilitation of certain abandoned mine sites identified by the DMR. The contract is for duration of 3 years and concludes at the end of March 2016. Subsequent to the signing of the agreement, further allocations of R55.6 million and an additional R24 million have been received from the DMR. These allocations were over and above the R165 million allocated at signing of the agreement. Due to the nature of these projects progress and expenditure has not been linear over the 3 year period.

Much of the first two years of the programme was spent on the specification, design, costing and tendering of the required rehabilitation. Most of the actual rehabilitation work is presently underway across 7 currently active projects with all of the original contract funds already spent and committed. The project work is planned to continue into the new contract period planned for 2016 – 2019 and for which negotiations are currently underway. It is still envisaged that the full budget of R 244.6 million will be committed by the end of March 2016 even though not all of the actual rehabilitation work will have been completed by that time.

The DMR has formally communicated that the Osizweni rehabilitation project, which has been planned and designed and for which an amount of R55.6 million was transferred, has been postponed due to external factors. The funds originally allocated thereto may be reallocated to other projects. Two large projects (Streatham and Bosrand) have already been designed and are ready to be advertised as tenders, thus enabling full allocation of the programme funds and continued work and uninterrupted spending into the planned new contract period.

Programme for developing human capital

Mintek implements a number of human capital development interventions funded by government grants. One of the interventions is the *Science, Technology, Engineering, Mathematics and Innovation (STEMI) Promotion*, which includes Mintek's Undergraduate and Postgraduate Bursary programmes, as well as the renowned *Minquiz* competition. *Minquiz* aims to encourage interest in careers in Science, Engineering and Technology among secondary school learners through fun-filled and curriculum-aligned competition that combines the rigors of an Olympiad with the excitement of a live quiz show. Mintek's drive to establish additional *Minquiz* centres across the country will continue in partnership with host institutions and corporate sponsors to broaden the footprint of the competition. It has been partially funded by corporate sponsorship and grants from a number of sponsors including the Department of Science and Technology, Sasol and others. A total of R1.6 million is budgeted for 2016/17.

Staff Bursaries are budgeted for Mintek employees for part-time undergraduate studies and postgraduate studies, both for technical (science and engineering) and non-technical studies. The programme also augments Mintek's retention strategy. Studies will be funded through the Science Vote while non-technical studies will be funded from Mintek funds. The total budget for the period is at R4.7 million for the 2016/17 financial year.

The *Work-Integrated Learning (WIL) Programme* provides a one year practical work-based learning experience for National Diploma and B.Tech students in fulfilment of their study requirements. The programme is fully-funded by the MQA. A budgeted expenditure of R2.8 million is estimated for WIL during the 2016/17 financial year.

The *Artisan Learnership Programme (ALP)* is aimed at training learners to become artisans and to achieve trade status and is funded by the Mining Qualifications Authority (MQA). In the 2016/17 financial year, Mintek is supporting 8 external female learners to become Artisans in the fields of fitting and instrumentation.

The *Graduate and Researcher Development* portfolio includes a Graduate Development Programme (GDP) which entails a structured on-the-job technical training programme, accompanied by soft skills training programme and is funded by Mintek. The primary focus is to place scientists and engineers on a structured development programme for them to gain and upgrade their professional registration with the South African Council for Natural Scientific Professions (SACNASP) and the Engineering Council of South Africa (ECSA). The programme has been extended from 12 months to 15 months from January 2015 in order to give candidates a more detailed learning experience and also to align with Mintek's performance management cycle.

A number of *Internship Programmes* are implemented to provide graduates the invaluable opportunity to obtain work exposure in a real world environment for a limited time period. There is a particular focus on providing internship opportunities to young unemployed black science and engineering graduates. The programmes are: the Department of Science and Technology Professional Development Programme (DST PDP), the Mining Qualifications Authority Graduate Development Programme (MQA GDP), and the Department of Science and Technology National Research Foundation (DST-NRF) Internship Programme.

The DST PDP aims to address the accelerated development of a group of scientists and research professionals at post-graduate level (Doctoral and post-Doctoral), that is specifically to encourage black scientists and engineers in particular to remain involved in research and further their research careers within Mintek's research environment. It is funded and administered using the NRF grant.

6. PERFORMANCE ASSESSMENT WEIGHTING

Table 5. Performance Assessment Weighting

OBJECTIVES	WEIGHTING
Enhance Mintek's visibility and credibility to all stakeholders	5%
Research and develop efficient mineral processing technologies and value added products and services	50%
Promote the mineral-based economies of rural and marginalised communities	15%
Uphold good governance	15%
Develop human capital and organisational skills to build world class R&D excellence	15%

CORPORATE SCORECARD, 2016/17 to 2018/19

To comply with the requirements of the Public Finance Management Act (PFMA), a set of annual corporate objectives have to be included in Mintek's Shareholder Compact and external reporting. For internal management control of the business, a more comprehensive set of indicators and Executive Committee priorities will apply and be used for regular internal reporting.

The corporate objectives and performance indicators for 2016/17 were developed during a planning session involving the Board and Mintek's management team. Various national documents were taken into account during the planning session, and the process followed their performance methodologies closely. Some of the documents included:

- "Framework for Managing Programme Performance Information" – Published by the National Treasury, May 2007, ISBN 978-0-621-37152-9: Formeset Printers Cape (Pty) Ltd;
- "Guide to the Outcomes Approach" – Prepared by the Presidency, Version: 27 May 2010.

The 12 National Outcomes contained in the "Guide to the Outcomes Approach" formed the starting platform for the Mintek planning process. The possible support and contribution that Mintek could make to each of the Outcomes was carefully considered, and these were formulated into Mintek's Strategic Objectives.

At the conclusion of the process, five Objectives supporting 5 of the 12 National Outcomes were identified, and these were cascaded into a larger number of Activities with measurable Performance Indicators. The mapping of National Outcomes to Activities and Indicators that emerged is as follows:

National Priority	Mintek Objectives
Decent employment through inclusive economic growth	– Research and develop efficient mineral processing technologies and value added products and services
A skilled and capable workforce to support an inclusive growth path	– Research and develop efficient mineral processing technologies and value added products and services – Promote the mineral economies of rural and marginalised communities
Vibrant, equitable and sustainable rural communities	– Promote the mineral economies of rural and marginalised communities
An efficient, effective and development oriented public service and an empowered, fair and inclusive citizenship	– Enhance Mintek's visibility and credibility to all stakeholders – Uphold good governance practices
Environmental assets and natural resources that are well protected and continually enhanced	– Research and develop efficient mineral processing technologies and value added products and services

The above Mintek Objectives have been grouped using a Balanced Scorecard Approach as shown below. Details of the score card highlighting Mintek's Strategic Objectives, Programs, Measures and Indicators follow in section 7.

Stakeholder perspective
– Enhance Mintek's visibility and credibility to all stakeholders. – Research and develop efficient mineral processing technologies and value added products and services. – Promote the mineral-based economies of rural and marginalised communities.
Financial & Internal Business Perspective
– Uphold good governance practices.
Learning and Growth Perspective
– Develop human capital and organisational skills to build world class R&D excellence.

7. CORPORATE SCORECARD

Stakeholder Perspective

Strategic Objective 1: Enhance Mintek's visibility and credibility to all stakeholders							
STRATEGIC PROGRAMMES PER OBJECTIVE (What elements constitute the Objective?)	**ACTIVITY PER PROGRAMME (What have we achieved by 31 March 2017)**	**PERFORMANCE INDICATOR (What elements constitute the Objective?)**	**Baseline 2015/16 Forecast**	**Annual Targets**			**Compact Number**
				2016 / 17	**2017 / 18**	**2018 / 19**	
Integrated marketing and communication functions	Updating and implementing the marketing and communications plan	Annually updated marketing and communications plan approved and implemented	1	1	1	1	2017-1.01
Enhancing the visibility and credibility of Mintek	Mintek promotion	# of technical articles in credible publications	35	35	35	35	2017-1.02
		# of conference presentations and posters	65	74	74	74	2017-1.03
	IP creation and transfer	# of Patents filed	5	7	7	7	2017-1.04
		# of IP license agreements	2	3	2	2	2017-1.05
		# of discoveries (IPR-PFRD Act)	10	21	23	23	2017-1.06
	Attained annual customer satisfaction target	% Annual Customer Satisfaction Rating Index	90	90	90	90	2017-1.07
	Enhanced media exposure	Advertising Value Equivalent (AVE) in R million	25.0	25.0	25.0	25.0	2017-1.08
	Enhanced relations with oversight bodies	# of requests for technical assistance to the DMR (upon request)	1	1	1	1	2017-1.09
		# of presentations to Parliament on impact of Mintek's work and role	2	2	2	2	2017-1.10
		Timely submission of Shareholder's Compact	1	1	1	1	2017-1.11
		Timely submission of quarterly reports on the attainment of targets in the scorecard	4	4	4	4	2017-1.12
	Integration of staff exchange	# of visits and # of instances of staff exchange	4	4	4	4	2017-1.13

Strategic Objective 2: Research and develop efficient mineral processing technologies and value added products and services							
STRATEGIC PROGRAMMES PER OBJECTIVE (What elements constitute the Objective?)	**ACTIVITY PER PROGRAMME (What have we achieved by 31 March 2017)**	**PERFORMANCE INDICATOR (What elements constitute the Objective?)**	**Baseline 2015/16 Forecast**	**Annual Targets**			**Compact Number**
				2016 / 17	**2017 / 18**	**2018 / 19**	
Competitive technologies, products and services for optimal mineral resource utilisation	Develop analytical and mineralogical methods and supply of services	# of methods	11	11	11	11	2017-2.01
		Rand value (Rm)	48.0	48.0	48.0	48.0	2017-2.02
	Develop new technologies under state grant	# of internal reports	40	75	75	75	2017-2.03
		# of new technologies	5	6	6	6	2017-2.04
		# of prototypes evidenced by reports	5	2	2	2	2017-2.05
	Sales of products, plant and equipment	# of reports	16	10	10	10	2017-2.06
		Rand value of control system sales (Rm)	26.0	23.0	23.0	23.0	2017-2.07
		Rand value of Certified Reference Materials (CRM) sales (Rm)	4.5	4.5	4.8	5.0	2017-2.08
	Commercial investigations and feasibility studies	# of external reports	120	119	120	120	2017-2.09
	Provision of Mineral Economics and Strategy advice	# of internal reports	8	8	8	8	2017-2.10
Beneficiation to value added products and services	Develop applications for precious-, ferrous- and base metals in the areas of:- Biomedicine (HIV, cancer, malaria) - Catalysis (chemical processing, fuel cells, environmental) - Nanotechnology (water, health) - Physical metallurgy R&D and metallurgical industry support	# of internal reports	16	18	18	18	2017-2.11
		# of external reports	15	15	15	15	2017-2.12
		# of reports from the Metals Technology Centre (MTC)	140	140	145	145	2017-2.13

Strategic Objective 2: Research and develop efficient mineral processing technologies and value added products and services							
STRATEGIC PROGRAMMES PER OBJECTIVE (What elements constitute the Objective?)	**ACTIVITY PER PROGRAMME (What have we achieved by 31 March 2017)**	**PERFORMANCE INDICATOR (What elements constitute the Objective?)**	**Baseline 2015/16 Forecast**	**Annual Targets**			**Compact Number**
				2016 / 17	**2017 / 18**	**2018 / 19**	
Green technologies	Develop water efficient processes and flow sheets to optimise water consumption and enable processing of ore bodies in water stricken areas	# of internal reports	5	11	11	11	2017-2.14
		# of external reports	4	4	4	4	2017-2.15
	Develop energy efficient processes, flow sheets and control technologies that minimise energy consumption and carbon emissions	# of internal reports	8	6	6	6	2017-2.16
		# of external reports	4	4	4	4	2017-2.17
	Develop waste management and recycling technologies for treating and recycling waste in order to extend mineral resources	# of internal reports	6	5	5	5	2017-2.18
		# of external reports	1	1	1	1	2017-2.19
	Rehabilitate derelict & ownerless mine sites	Money spent and/or committed on rehabilitation projects (Rm)	46	55	55	55	2017-2.20

-Strategic Objective 3: Promote the mineral-based economies of rural and marginalised communities							
STRATEGIC PROGRAMMES PER OBJECTIVE (What elements constitute the Objective?)	**ACTIVITY PER PROGRAMME (What have we achieved by 31 March 2017)**	**PERFORMANCE INDICATOR (What elements constitute the Objective?)**	**Baseline 2015/16 Forecast**	**Annual Targets**			**Compact Number**
				2016 / 17	**2017 / 18**	**2018 / 19**	
Development of technologies and strategies relevant to rural and marginalised communities	Establish technologies and strategies relevant to small scale operators, for transfer to rural and marginalised communities	# of technologies adapted or developed	2	2	2	2	2017-3.01
		# of feasibility reports	10	10	12	12	2017-3.02
Economically sustainable businesses created in rural and marginalised communities	Develop and support economically sustainable rural and marginalised communities	# of new businesses created	5	4	4	4	2017-3.03
		# of jobs created from new businesses	60	40	40	40	2017-3.04
		% of businesses still in existence after 1 year	95	95	95	95	2017-3.05
		% of businesses still in existence after 2 years	70	70	72	75	2017-3.06
Training and skills development interventions in rural and marginalised communities	Provide value-added beneficiation training relevant to rural and marginalised communities.	# of people trained	120	100	100	100	2017-3.07
		Maintain accreditation in jewellery manufacturing / design and small scale mining as evidenced in certificate or report	maintained	maintained	maintained	maintained	2017-3.08

Financial & Internal Business Perspective

Strategic Objective 4: Uphold good governance practices							
STRATEGIC PROGRAMMES PER OBJECTIVE (What elements constitute the Objective?)	**ACTIVITY PER PROGRAMME (What have we achieved by 31 March 2016)**	**PERFORMANCE INDICATOR (What elements constitute the Objective?)**	**Baseline 2015/16 Forecast**	**Annual Targets**			**Compact Number**
				2016 / 17	**2017 / 18**	**2018 / 19**	
Enhanced fiscal discipline and the effective management of resources	BEE procurement as a % of total discretionary spend	% BEE Spend of total discretionary spend	60	80	85	85	2017-4.01
	Strengthened Internal Financial Controls	Unqualified audit as evidenced in audit report	unqualified	unqualified	unqualified	unqualified	2017-4.02
	Sound Debtor Management	% Debtors write off of commercial revenue	< 0.50	< 0.25	< 0.25	< 0.25	2017-4.03
		Average Debtors Days	< 65	< 65	< 65	< 65	2017-4.04
	Total Income	Rand Value (R'000)	532 453	537 319	537 606	536 071	2017-4.05
	Net Result (surplus)	Rand Value (R'000)	12 693	11 288	1 210	2 295	2017-4.06
	Optimal Yield on Investment	% Return on investment	4	4	4	4	2017-4.07
	Total Capital Expenditure	Rand Value (Including Funding) (R'000)	45 375	39 082	40 254	41 462	2017-4.08
	Maintained balance between R&D and Commercial Revenue streams	Ratio of Research / Total Revenue expressed as a %	55	60	60	60	2017-4.09
	Maintained balance between TCTC Salary Bill/Total Expenditure	Ratio of TCTC Salary Bill / Total Expenditure expressed as a %	55	58	58	55	2017-4.10
	Enhanced Liquidity Ratio	Liquidity Ratio	> 2	≥ 2	≥ 2	≥ 2	2017-4.11
	Improved cash flows from operations	Cash generated from operations after working capital (excluding movements in deferred income) (R'000)	> 2 000	> 2 000	> 2 000	> 2 000	2017-4.12
Enhanced organisational efficiencies	Productivity Ratio	Recoverability %	85	90	90	90	2017-4.13
	Energy Efficiency	Power factor correction	< 1.0	< 0.9	< 1.0	< 1.0	2017-4.14
		Efficiency monitoring	-	Implementation of energy	Reduced energy	Reduced energy	2017-4.15

Strategic Objective 4: Uphold good governance practices							
STRATEGIC PROGRAMMES PER OBJECTIVE (What elements constitute the Objective?)	**ACTIVITY PER PROGRAMME (What have we achieved by 31 March 2016)**	**PERFORMANCE INDICATOR (What elements constitute the Objective?)**	**Baseline 2015/16 Forecast**	**Annual Targets**			**Compact Number**
				2016 / 17	**2017 / 18**	**2018 / 19**	
				savings initiative	utilisation = 5%	utilisation = 5%	
	ICT Security	Intrusions/virus breakouts on system	< 3	< 3	< 3	< 3	2017-4.16
	Monitoring of critical facility availability	Upside / availability of critical facilities (%)	90	≥ 98	≥ 98	≥ 98	2017-4.17
Compliance with national and international regulatory frameworks, and applicable standards	Compliance with appropriate standards, regulations and legislation	% achievement of compliance checklist	100	100	100	100	2017-4.18
	Internal Audits conducted	No. of audits	16	16	16	16	2017-4.19
	Review of the Audit Committee Charter	No. of reviews	1	1	1	1	2017-4.20
	Fraud Awareness Campaigns	No. of campaigns	8	8	8	8	2017-4.21
Enhanced Safety, Health, Environment and Quality	SHEQ standards maintained and enhanced	Maintain Mintek Accreditation status	maintained	maintained	maintained	maintained	2017-4.22
		Achieved target for Fatalities	0	0	0	0	2017-4.23
		Achieved target for Lost Time Injury Frequency Rate (LTIFR)	< 1	< 1	< 1	< 1	2017-4.24

ning & Growth Perspective

Strategic Objective 5: Develop human capital and organisational skills to build world class R&D excellence							
STRATEGIC PROGRAMMES PER OBJECTIVE (What elements constitute the Objective?)	**ACTIVITY PER PROGRAMME (What have we achieved by 31 March 2017)**	**PERFORMANCE INDICATOR (How do we measure our progress?)**	**Baseline 2015/16 Forecast**	**Annual Targets**			**Compact Number**
				2016 / 17	**2017 / 18**	**2018 / 19**	
Training and Skills Development	Enhanced Skills Development	WSP Compliance Report	1	1	1	1	2017-5.01
		Total spend on training expressed as a % of payroll	2	2	2	2	2017-5.02
	Enhanced relationships with Institutions of Higher Education and other similar organisations.	Number of partnerships in place	5	6	7	7	2017-5.03
		# of partnerships with previously disadvantaged Higher Education Institutions	2	3	2	2	2017-5.04
		# of Graduate Recruitment Programmes and other Science Events	12	10	10	10	2017-5.05
	Science, Technology, Engineering and Maths (STEM) Promotion	Annual Provincial and Minquiz competition	1	1	1	1	2017-5.06
	Effective Full-time Bursary Programme	# of under-graduate bursars	12	10	10	10	2017-5.07
		% Under-graduates Absorption Rate	100	100	100	100	2017-5.08
		# of post graduate bursars	13	13	13	13	2017-5.09
		% Postgraduate Absorption Rate	100	100	100	100	2017-5.10
	Effective Part–time Bursary Programme	# of under-graduate bursars	40	20	15	10	2017-5.11
		# of post-graduate bursars	51	38	20	20	2017-5.12
	Work-Integrated Learning, Studentships and Internship Programmes	# of Candidates enrolled	120	60	60	60	2017-5.13
	Artisan Learnership Programme	# of Persons enrolled	8	8	8	8	2017-5.14
		% Retention of learners	100	100	100	100	2017-5.15

Strategic Objective 5: Develop human capital and organisational skills to build world class R&D excellence							
STRATEGIC PROGRAMMES PER OBJECTIVE (What elements constitute the Objective?)	**ACTIVITY PER PROGRAMME (What have we achieved by 31 March 2017)**	**PERFORMANCE INDICATOR (How do we measure our progress?)**	**Baseline 2015/16 Forecast**	**Annual Targets**			**Compact Number**
				2016 / 17	**2017 / 18**	**2018 / 19**	
	Development Programmes for recent graduate scientists & engineers	Graduate Development Programme review report	1	1	1	1	2017-5.16
	Development Programme for researchers, scientists, engineers and technicians	An approved programme	1	1	0	1	2017-5.17
Organisational Development	Transformation of the Mintek Organisation	Report on compliance with DoL regulations	1	1	1	1	2017-5.18
		% of women at Mintek (towards achievement of Employment Equity targets)	45	46	46	46	2017-5.19
		% employees with disability (towards achievement of Employment Equity targets)	3	3	3	3	2017-5.20
		Interventions to increase women representation in Mintek	1	1	1	1	2017-5.21
		Overall % of designated groups (towards achievement of Employment Equity targets)	90	90	90	90	2017-5.22
	Structured mentorship programme to transfer skills and knowledge from specialists to mid-level professionals	% of employees participating in structured interactions between specialists and mid-level professionals	10	10	10	10	2017-5.23
	Compliance with Performance Management Policy	% Performance Contracts and Assessment done and signed (for qualifying employees)	100	100	100	100	2017-5.24
	Enhanced Experience Profile of Researchers	Average years of Mintek experience of researchers	4	4	4	4	2017-5.25
		Average age of researchers at Mintek	33	33	33	33	2017-5.26
	Proportion of Researchers to Total Staff	Proportion expressed as a %	40	33	33	33	2017-5.27

Strategic Objective 5: Develop human capital and organisational skills to build world class R&D excellence							
STRATEGIC PROGRAMMES PER OBJECTIVE (What elements constitute the Objective?)	**ACTIVITY PER PROGRAMME (What have we achieved by 31 March 2017)**	**PERFORMANCE INDICATOR (How do we measure our progress?)**	**Baseline 2015/16 Forecast**	**Annual Targets**			**Compact Number**
				2016 / 17	**2017 / 18**	**2018 / 19**	
	Proportion of staff with Masters degree	Proportion of staff with Masters degree expressed as a %	10	10	10	10	2017-5.28
	Proportion of staff with Doctoral degree	Proportion of staff with Doctoral degree expressed as a %	5	5	5	5	2017-5.29
	Enhanced staff Retention & Succession	Staff Turnover rate	9	9	9	9	2017-5.30
		% Staff Turnover of Professionals in Mintek core Divisions	10	10	10	10	2017-5.31
		% of Core to Support employees	75	75	75	75	2017-5.32
	Effective Leadership Development Programme	# of employees benefiting from Leadership Development Programme	35	0	30	0	2017-5.33
Employee Health and Wellness	Enhanced Employee Health and Wellness Programme	# of Employee Wellness Programme interventions	4	5	5	5	2017-5.34
		% of Working days lost to absenteeism	3.5	3.5	3.5	3.5	2017-5.35
		% compliance with obligatory annual medical assessment	100	100	100	100	2017-5.36
Effective human resource systems	Enhanced administrative efficiency	Average time (in months) to fill vacancies	2.5	2.5	2.5	2.5	2017-5.37
		Vacancy rate	7	7	7	7	2017-5.38

It is hereby recorded that the Corporate Scorecard, as presented in Section 7 above has been accepted by the Shareholder.

Dated at _____ on this the _____ day of _____ 2016.

AS WITNESSES:

1. _____ _____

(Minister of Mineral Resources for and on behalf of the Republic of South Africa)

2. _____

Dated at RANDBURG on this the 29th day of JANUARY 2016.

AS WITNESSES:

1. _____ _____

(Chairperson of the Board of Mintek)

2. _____

MINISTRY
MINERAL RESOURCES
REPUBLIC OF SOUTH AFRICA

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The Chairperson
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Dear Ms L Makatini

APPROVAL OF 2016/17 MINTEK SHAREHOLDER COMPACT

I hereby wish to advise you that I have received Mintek's 2016/17 Shareholder Compact and have approved it accordingly.

I hope that you find the above in order.

Kind Regards

Mr M.J ZWANE, MP
MINISTER OF MINERAL RESOURCES

DATE: 07/03/2016

APPENDIX I – MATERIALITY FRAMEWORK

MATERIALITY FRAMEWORK FOR THE 2016/2017 FINANCIAL YEAR

1. BACKGROUND

Mintek's **vision** is to be a global leader in mineral and metallurgical innovation.

The **mission** of Mintek is to serve our stakeholders by adding value to mineral resources through technology, industrial growth and human development in a sustainable manner.

Mintek's strategic goals are to:

- Enhance Mintek's visibility and credibility to all stakeholders;
- Research and develop efficient mineral processing technologies and value added products and services;
- Promote the mineral based economies of rural and marginalised communities;
- Uphold good governance practices;
- Develop human capital and organizational skills to build world class R&D excellence.

2. SCOPE

The materiality framework is developed in accordance with Treasury Regulation 28.3.1 which requires that for the purposes of materiality [sections 50(1), 55(2), & 66(1) of the Public Finance Management Act (PFMA)] and significance [section 54(2) of the PFMA], the Accounting Authority must develop and agree on a framework of acceptable levels of materiality and significance with the relevant Executive Authority. This framework will be reviewed annually prior to the commencement of the financial year.

3. PURPOSE

The purpose of the document is to record the level and reasoning for the suggested levels of materiality for consideration by the Board and approval by the Executive Authority as required. It outlines management's assessment of qualitative and quantitative materiality, taking cognizance of the existing framework of risks and controls within Mintek. The materiality framework, as set out below, represents management's assessment of the potential impact of transactions and other events within Mintek on the presentation of financial information used for decision making by management, and other users of the financial statements.

Corporate accountability in essence requires companies to be accountable for their decisions and performance that have a potentially large impact on people, the environment or company value.

Materiality as a concept is therefore used to determine the materiality or significance of the issues to be reported for Mintek as noted above.

4. DEFINING 'MATERIAL' AND 'SIGNIFICANT'

The materiality concept states that financial information is material to the financial statements if it would change the opinion or view of a reasonable person. In other words, all important financial information that would sway the opinion of a financial statement user should be included in the financial statements.

International Accounting Standards (IAS 1), Presentation of Financial Statements, read together with South African Accounting Standards (SAAS 320.03), defines items as material 'if they could, individually or collectively, influence the economic decisions of users taken on the basis of the financial statements. Materiality depends on the size and nature of the omission or misstatement judged in the surrounding circumstances. The size or nature of the item, or a combination of both, could be the determining factor.' Materiality can thus be either quantitative or qualitative or both. Materiality is inherently subjective in nature and it enables a company to measure and disclose only those transactions that are sufficiently large amounts to be of concern to the users of financial statements. 'Significant' implies a higher level of importance than 'material'. A significant transaction impacts on Mintek as a whole. An occurrence may be material but not necessarily significant, whereas any occurrence that is significant will be material, as it will have an impact on the fulfilment of Mintek's mandate as a public entity and its operative effectiveness. In terms of Mintek's nature of business and extent of operations, a significant

item is defined as one which exceeds the maximum monetary limit that the Chief Executive Officer of Mintek can authorize, in terms of Mintek's Delegation of Authority.

In the Mintek environment, the public nature of the funds that constitute a significant portion of Mintek's income necessitates a narrower definition of "material" than merely being an influence on economic decisions. As such, therefore, the definition of "material" transactions within Mintek will necessarily include any transactions that may have an impact on the presentation of the annual financial statements, as an accurate representation of the "full and proper records of the financial affairs" of Mintek, as required by Section 55(1)(a) of the PFMA.

Implications

An understanding and application of the concept of materiality helps to manage, and be seen to be managing significant impacts and issues better. Matters that rise to the level of 'materiality' are those that require high-level, co-coordinated effort. Many other issues, whilst not material, will still be addressed and managed by the company, and need to be communicated to stakeholders – but in focused, targeted ways – not in the annual report.

With a full understanding of materiality and how it works, stakeholders should become better equipped to raise the issues that matter most to them.

5. DETERMINATION OF MATERIALITY - GUIDELINES APPLIED IN THE COMPUTATION OF MATERIALITY

Quantitative Materiality can be based on a number of financial indicators of the type that is widely used and accepted in the accounting profession as a basis of calculating materiality.

The following table depicts acceptable basis used in the computation of materiality.

Basis	Acceptable Ranges
Gross Revenue/Turnover	0.2% – 1 %
Net Income	1 – 5 %
Total Asset	1 – 2 %
Equity	0.5 – 2 %

5.1 Significance of Indicators

The nature of Mintek is such that both the balance sheet and the income statement indicators are of significance. Mintek has significant assets and revenue streams – both are significant to the users of the financial information.

5.2 Stability of Indicators

Gross revenue and total assets remained stable indicators for Mintek despite the volatile economic conditions of recent years and will therefore be used in the calculation of materiality. The preliminary gross revenue for the first 9 months of the 2015/16 financial year and the forecast revenue for the remaining three months, appear to be indicative of the likely results for the year. This figure will then be adjusted by an anticipated inflation growth average of 5% for the 2016/17 year.

Net income should be disregarded as MINTEK is not a profit making institution, and there are fluctuations and many dependencies that influence this figure.

Mintek has historically used a rate of 0.3% in calculating the materiality level. This is within the range specified above of 0.2% - 1% of gross revenue and provides a level that is acceptable both quantitatively and qualitatively.

5.3 Computation of Materiality

Gross revenue:

As stated above, Mintek has historically used the preliminary results for the nine months of the 2015/16 financial year and the forecast revenue for the remainder of the year; however the 2015/2016 forecast budget as indicated in the compact will be used for the computation of materiality. The calculations are as follows:
Gross Turnover:
0,3% of R 537 757 757= R 1 613 273

Asset calculation

Use 1% of R 712 867 210(total assets) = R 7 128 672

Different levels can be set for different classes of transactions. Mintek has however decided to take a less conservative approach by using gross revenue and not assets as the basis for calculating Materiality. The Materiality level will cover all classes of transactions.

The materiality for the previous financial period was set at R 1.5 million, representing the lower end of the range for gross revenue. Gross revenue/turnover includes 100% state grant allocation, revenue from contract research, and sales of products and services. The calculations above results in the materiality figure of R 1.6 million however Mintek has decided to keep materiality at the same levels as in the previous financial period mainly because the sudden increase in revenue is project driven and may decrease in future.

Therefore the materiality for the current period will be kept at R1.5 million.

6. CONTROL ENVIRONMENT

The Board of Directors consists of independent non-executive members who are appointed by the Minister of Mineral Resources. The Audit and Risk Committee consists of some Board members and two independent non-Board members.

Mintek is managed by a CEO assisted by five General Managers, who together make up the Executive Management team. Mintek maintains a system of internal controls designed to provide reasonable assurance as to the integrity and reliability of its financial statements, to safeguard its assets and to minimize the risk of fraud. In terms of the Audit Committee charter, the Audit and Risk Committee reviews the effectiveness of the system of internal controls.

A Risk Steering Committee assists in reviewing the risk management process and significant risks facing the organization. In terms of the Risk Management Framework, this review is delegated to the CEO.

The Internal Audit function is established and operational. The performance of the Internal Audit function is subject to evaluation by the Audit and Risk Committee, in terms of the Audit and Risk Committee and Internal Audit charters. Additionally, the Audit and Risk Committee reviews and approves the Internal Audit charter, internal audit plans and ongoing internal audit reports on the effectiveness of Mintek's internal controls.

Although Mintek is an entity within the Department of Mineral Resources (DMR), it is also accountable to the Department of Science & Technology (DST) for its Research and Development (R&D) and technology related activities. Strategic goals encompassing economic, technical, social and environmental objectives, determined by the Government and DMR, provide Mintek with a basis for evaluating its activities. These criteria are, therefore, also used in the assessment of significant risks facing Mintek.

6.1 Stakeholders

The primary stakeholders are the Departments of Mineral Resources and Science & Technology.

Users of financial statements:

- Department of Mineral Resources
- Department of Science & Technology
- National Treasury
- Banking institutions
- South African Revenue Services
- Suppliers and other creditors

7. QUANTITATIVE MATERIALITY

Materiality refers to the extent or nature of a misrepresentation and/or omission of financial information which, individually or collectively, can, in the light of surrounding circumstances cause the judgment or decision of a reasonable person to be influenced by such misrepresentation and/or omission when making a decision on the basis of the said information.

In addition to the overall quantitative materiality determined, all transactional items exceeding R50,000 in value which meet the necessary prerequisites for recognition as accruals at year-end, will be classified as such.

Items less than R50,000 which meet the criteria will be considered on merit. Where it is too difficult to value small items, these will be regarded as immaterial. The overriding criteria, however, is that the aggregate of all such small items, individually judged to be immaterial, may not exceed 0.3% of Gross revenue.

In addition, items that individually or collectively meet the definition of "significant" or "material", as defined earlier in this framework will be considered separately for assessment of materiality and risk. The figure of R1.5million therefore, functions as a guideline to inform management in the overall consideration and management of risk.

8. QUALITATIVE MATERIALITY

Materiality is not merely related to the size of the entity and elements of the financial statements. Misstatements that are large individually or in aggregate may affect the reasonable users' judgement. Misstatements may also be material on qualitative grounds. The following are some of the qualitative factors to be considered:

- Any breaches to procedures or processes required by legislation or regulation
- Transaction entered into that could result in the reputation risk to Mintek.
- Unusual transaction entered into that are not of a repetitive nature as well as new ventures that Mintek has entered into. These are purely disclosed due to their nature and the knowledge that they could affect the decision of the users of financial statements.
- Any fraudulent and dishonest behaviour of officers or staff.

APPENDIX II – FRAUD PREVENTION PLAN

GLOSSARY OF TERMS

Throughout this document, unless otherwise stated, the words in the first column below have the meanings stated opposite them in the second column (and cognate expressions shall bear corresponding meanings):

"Cabinet" Parliamentary Cabinet of the Republic of South Africa

"Code" For Mintek Staff Members as prescribed in the Mintek Code of Conduct and Business Ethics policy

"Fraud and corruption" includes, but is not limited to, the following legal definitions:

(i) Fraud, i.e. "the unlawful and intentional making of a misrepresentation resulting in actual or potential prejudice to another";

(ii) Theft, i.e. the unlawful and intentional misappropriation of another's property or property which is in his/her lawful possession, with the intention to deprive the owner of its rights permanently";

(iii) Offences in respect of corrupt activities as defined in the Prevention and Combating of Corrupt Activities Act, 2004, i.e.:

- The general offence of corruption which could be summarised as directly or indirectly accepting or agreeing to accept any gratification from another person; giving or agreeing to give any other person any gratification in order to influence that person directly or indirectly to exercise his powers, duties or legal obligations in a manner which is/amounts to:

    a. Illegal, dishonest, unauthorised, incomplete, or biased;
    b. Misuse or selling of information or material acquired;
    c. Abuse of position of authority;
    d. Breach of trust;
    e. Violation of a legal duty or set of rules;
    f. Designed to achieve an unjustified result; and
    g. Any other unauthorised or improper inducement to do or not to do anything.

- Corrupt activities in relation to:

    a. Public officials;
    b. Foreign public officials;
    c. Agents;
    d. Judicial officers;
    e. Members of the prosecuting authority;
    f. Unauthorised gratification received or offered by or to a party to an employment relationship;

g. Witnesses and evidential material during certain proceedings;
h. Contracts;
i. Procuring and withdrawal of tenders;
j. Auctions;
k. Sporting events; and
l. Gambling games or games of chance.

- Conflicts of interests and other unacceptable conduct, e.g.:

a. Acquisition of private interests in contract, agreement in or investment in public body;
b. Unacceptable conduct relating to witnesses; and
c. Intentional interference with, hindering or obstruction of investigation of offence;

- Other offences relating to corrupt activities, viz.:

a. Accessory to or after an offence;
b. Attempt, conspiracy and inducing another person to commit offence; and

- Failure to report corrupt transactions.

Fraudulent and corrupt acts may include:

i. Systems issues: where a process/system exists which is prone to abuse by employees, the public or other stakeholders, e.g.:

a. Procurement fraud, e.g. irregular collusion in the awarding of tenders or orders for goods and/or services;
b. Deliberate non-compliance with delegation of authority limits;
c. Collusion in contracts management;
d. Revenue fraud; e.g. Mintek officials' reluctance in verifying the suppliers/contractors VAT details before any contractual agreement can be entered into with the purposes of rendering services to Mintek.
e. Travel and subsistence fraud;
f. Abuse of sick leave or other permissible leave;
g. Disclosing confidential or proprietary information to outside parties.

ii. Financial issues: i.e. where individuals or companies have fraudulently obtained money from Mintek, e.g.:

a. Syndicate fraud;
b. Creditors fraud, e.g. diverting payments to incorrect creditors;
c. Suppliers submitting invalid invoices or invoicing for work not done; and
d. Payroll fraud, e.g. creation of "ghost employees".

iii. Equipment and resource issues: i.e. where Mintek's equipment or other sources utilised for personal benefit or stolen, e.g.:

a. Theft of assets, e.g. computers, face value forms, consumables, (stationery, globes, fuses) etc.;
b. Personal use of resources, e.g. telephones, internet, e-mail; and
c. Irregular destruction, removal, or abuse of records (including intellectual property); and
d. Misuse of the Mintek's official time for personal gain/purposes.

iv. Other issues: i.e. activities undertaken by employees of Mintek, which may be against policies or fall below established ethical standards, e.g.:

a. Soliciting gifts or favours from consultants or other suppliers, e.g. acceptance of "kick-backs";
b. Pursuing private business interests without permission;
c. Nepotism; and Favouritism.

"Fraud Policy"	Fraud risk and whistle blowing policy
"Managers"	Includes all Members of Management and, where appropriate Supervisors
"PFMA"	The Public Finance Management Act (PFMA), 1999 (Act No. 1 of 1999)
"Plan"	Fraud Prevention Plan
"Protected Disclosures Act"	Protected Disclosures Act, Act 26 of 2000

1. INTRODUCTION

Section 27.2.1 of the Treasury Regulations, issued in terms of the Public Finance Management Act, 1999 states that the Accounting Authority must ensure that a risk assessment is conducted regularly so as to identify emerging risks of the public entity. A risk management strategy, which must include a fraud prevention plan, must be used to direct internal audit effort and priority and to determine the skills required of managers and staff to improve controls and to manage these risks

2. APPROACH TO UPDATING THE PLAN

2.1 Mintek has a risk register/plan in place, which is updated on a regular basis. The plan was updated with the view to put measures in place to mitigate the effects of the risks identified in the risk register of Mintek.

2.2 The Plan also incorporates principles contained in the Public Sector Anti-Corruption Strategy dated January 2002, endorsed by Cabinet.

2.3 The Code and the Fraud Policy, as approved, forms an integral part of the Fraud Prevention Plan.

2.4 The fraud and corruption risks identified in the updating of the Plan cannot be relied upon as an indication of the full spectrum of fraud and corruption risks facing Mintek, but rather as an indication of the type of risks.

2.5 The Plan does not guarantee that Mintek will not be impacted by incidents of fraud and corruption but is intended to serve as an additional measure to assist in the limitation of fraud and corruption risk with a particular focus on creating awareness and promoting ethical business conduct.

3. COMPONENTS OF THE PLAN

The main principles of the Plan are the following:

- Creating a culture which is intolerant to fraud and corruption;
- Deterrence of fraud and corruption;
- Preventing fraud and corruption which cannot be deterred e.g. miss use of internet, conducting private affairs during official hours, etc.;
- Detection of fraud and corruption;
- Investigating detected fraud and corruption;
- Taking appropriate action against fraudsters and corrupt individuals, e.g. prosecution, disciplinary action, etc.; and
- Applying sanctions, which include redress in respect of financial losses.

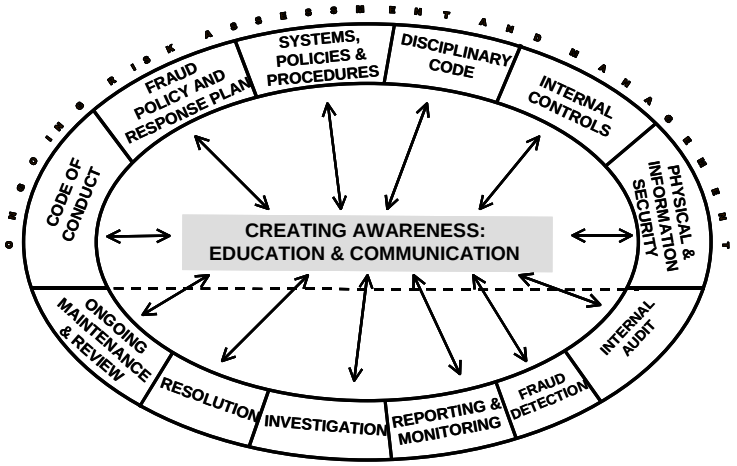
The objectives of the Plan could be summarised as follows:

- Encouraging a culture within Mintek where all employees, the public and other stakeholders continuously behave ethically in their dealings with, or on behalf of Mintek;
- Improving accountability, efficiency and effective administration within Mintek;
- Improving the application of systems, policies, procedures and regulations;
- Changing aspects of Mintek which could facilitate fraud and corruption and allow these to go unnoticed or unreported; and
- Encouraging all employees and other stakeholders to strive toward the prevention and detection of fraud and corruption impacting or having the potential to impact on Mintek's activities.

The above is not intended to detract from the premise that all the components are equally essential for the successful realisation of the Plan. The components of the Plan for Mintek are the following:

(a) A Code of Conduct and Business Ethics Policy in which the management of Mintek believes, and requires their employees to subscribe;
(b) Mintek's systems, policies, procedures, rules and regulations;
(c) The Disciplinary and Grievance Code;
(d) Sound internal controls to prevent and detect fraud and corruption;
(e) Physical and information security management;
(f) Internal Audit;
(g) Ongoing risk assessment and management, which includes systems for fraud and corruption detection;
(h) Reporting and monitoring of allegations of fraud and corruption;
(i) A Fraud Policy which includes the policy stance of Mintek on fraud and corruption and a response plan which incorporates steps for the reporting as well as proper resolution of reported and detected incidents and allegations of fraud and corruption;
(j) Creating awareness amongst employees, the public and other stakeholders (e.g. goods and service providers) through communication and education relating to relevant components of the Plan, the Code and the Fraud Policy; and
(k) Ongoing maintenance and review of the Plan to ensure effective project-management of its further implementation and maintenance.

An illustration of the Plan is contained in the figure below:



4. PREVENTING FRAUD AND CORRUPTION

4.1 Code of Conduct and Business Ethics

4.1.1 The ethical principles contained in the Code are applicable to all employees of Mintek. Therefore, the Code forms part of the Plan for Mintek.

4.1.2 Mintek will arrange workshops to create awareness of the Code among employees. A further objective of this training is to reinforce the expectations of Mintek and the governance of employees of Mintek with regard to their conduct and behaving ethically and with integrity.

4.1.3 Processes and mechanisms to manage professional ethics are key to the fight against fraud and corruption. In line with the principles contained in the Public Sector Anti-Corruption Strategy, Mintek will pursue the following additional steps to communicate the principles contained in the Code:

a) A copy of the Code will continue to be circulated to all employees and included in induction packs for new employees.

b) Include relevant aspects of the Code in further awareness presentations, training sessions and communication programmes to create awareness thereof amongst employees and other stakeholders. Further objectives of this training will be the following:

- Helping employees to understand the meaning of unethical behaviour (including harassment in any form) in line with expectations of Mintek;
- Presenting case studies which will assist in developing behaviour to articulate and encourage attitudes and values which support ethical business conduct;
- Helping employees to understand issues involved in making ethical judgements; and
- Communicating the implications of unethical behaviour and its impact for individuals, the workplace, professional relationships, Mintek as whole and external stakeholders including the public.

4.1.4 The development of a more robust system for the declaration of private business interests, actual or potential conflicts of interest by all employees and a policy regarding the acceptance and offering of business courtesies as keeping of a centralised record thereof will be considered.

4.2 Mintek's Systems, Policies, Procedures, Rules and Regulations

4.2.1 Mintek has a number of systems, policies, procedures, rules and regulations designed to ensure compliance with government legislation.

4.2.2 The management of Mintek will improve awareness and knowledge of the relevant systems, policies, procedures, rules and regulations, including the requirements of the PFMA and the Preferential Procurement Policy Framework Act amongst its employees. Mintek will develop clearly defined communication and training strategies to create awareness of existing and new policies and procedures in order to ensure that all employees are made aware of, and adequately trained in the implementation of policies and procedures relevant to their duties and responsibilities, including:

(a) Provisions for all employees to acknowledge, in writing, that they have read the policies and procedures applicable to their duties, have undergone relevant training and/or are aware of these policies and procedures;

(b) The keeping of adequate records serving as proof that employees have been made aware of the policies and procedures relevant to their duties; and

(c) The development and distribution of a regular communiqué outlining the importance of complying with policies and procedures and the implications for employees; for example, the taking of corrective action against offenders not complying with policies and procedures.

4.2.3 A structured monitoring mechanism will be administrated for the keeping of proper records of the policies and procedures that are being updated, and of new policies and procedures that are being developed in order to set clear targets and monitor progress.

4.2.4 Mintek is committed to developing human resources systems, policies and procedures, which will incorporate the fraud and corruption prevention practices detailed below.

(a) The administration of a system for transparent and merit-based hiring and promotion practices with objective standards in order to reduce the risk of nepotism and favouritism, both of which are damaging forms of fraud and corruption;

(b) Thorough pre-employment and security clearance screening of candidates for sensitive positions. Mintek will verify at least the previous employment, qualifications, citizenship, and criminal records of all persons before they are employed;

(c) Mintek recognises that, despite ongoing organisational and policy changes, for example employment equity policies, matching of competence to the job is extremely important. As part of its approach to the management of human resources, Mintek will continue to pursue steps to limit the risk of incompetent people being appointed.

4.2.5 Management must be held accountable for complying with, and implementing, Mintek's systems, policies, procedures, rules and regulations and for preventing fraud and corruption. This will be addressed in job descriptions, agreed work plans and performance contracts.

4.2.6 Mintek will also administrate a system with clear guidelines for the placing of prohibitions on individuals and restriction of entities found guilty of fraud and corruption against it.

Disciplinary and grievance code

4.2.7 The disciplinary and grievance code prescribes appropriate steps to be taken to resolve disciplinary matters.

4.2.8 Mintek recognises the fact that the consistent and efficient application of disciplinary measures is an integral component of effective fraud and corruption prevention. The following steps to expedite the consistent, efficient and speedy application of disciplinary measures will be initiated:

(a) Creating awareness amongst employees of conduct which is forbidden in terms of the disciplinary and grievance code. Where disciplinary standards are not adhered to, action will be taken against offenders;

(b) Ongoing training of managers in the application of disciplinary measures and the disciplinary process, and sustaining this training;

(c) Developing a system to facilitate the consistent application of disciplinary measures; and

(d) Regular monitoring and review of the application of discipline with the objective of improving weaknesses identified.

4.2.9 Where managers are found to be inconsistent and/or inefficient in the application of discipline corrective action will be implemented.

Internal Controls:

4.2.10 This section of the Plan relates to basic internal controls to prevent and detect fraud and corruption and the training of employees in internal control and the conducting of their day-to-day duties. The systems, policies, procedures, rules and regulations of Mintek prescribe various controls, which if effectively implemented, would limit the risk of fraud and corruption. These controls may be categorised as follows, it being recognised that the categories contain overlapping elements:

Prevention controls: These are divided into two sub-categories, namely, Authorisation and Physical;

Detection controls: These are divided into four categories, namely, Arithmetic and Accounting, Physical, Supervision, and Management Information; and

Segregation of duties.

PREVENTION CONTROLS**:**

(a) *Authorisation:*
   (i) All transactions require authorisation or approval by an appropriate responsible person.
   (ii) The limits for these authorisations are specified in the delegations of authority of Mintek as well as in various government prescripts.

(b) *Physical:*

These controls are concerned mainly with the custody of assets and involve procedures and security measures designed to ensure that access to assets is limited to authorised personnel.

DETECTION CONTROLS:

(a) *Arithmetic and accounting*
  (i) These are basic controls within the recording function which check that transactions to be recorded and processed have been authorised, that they are complete, and that they are correctly recorded and accurately processed.
  (ii) Such controls include checking the arithmetical accuracy of records, the maintenance and checking of totals, reconciliations, control accounts, and accounting for documents.

(b) *Physical*
  (i) These controls relate to the security of records. They therefore underpin arithmetic and accounting controls.
  (ii) Their similarity to preventive controls lies in the fact that these controls are also designed to limit access.

(c) *Supervision*
  This control relates to supervision by responsible officials of day-to-day transactions and the recording thereof.

(d) *Management information*
  (i) This relates to the review of management accounts and budgetary control.
  (ii) These controls are normally exercised by management outside the day-to-day routine of the system.

SEGREGATION OF DUTIES:

(a) One of the primary means of control is the separation of those responsibilities or duties that would, if combined, enable one individual to record and process a complete transaction, thereby providing him/her with the opportunity to manipulate the transaction irregularly and commit fraud and corruption.

(b) Segregation of duties reduces the risk of intentional manipulation or error and increases the element of checking.

(c) Functions that should be separated include those of authorisation, execution, custody, and recording and, in the case of computer-based accounting systems, systems development and daily operations.

(d) Placed in context with fraud and corruption prevention, segregation of duties lies in separating either the authorisation or the custodial function from the checking function.

4.2.11 Mintek will continue to initiate steps to address the problem of lack of training, expertise and knowledge in systems, policies, procedures, rules and regulations to improve internal control. Areas of weakness will be identified during audits and risk assessments.

4.2.12 Furthermore, Mintek will also continue to re-emphasise to all supervisors that consistent compliance by all employees with internal control is one of the fundamental controls in place to prevent fraud and corruption.

4.2.13 Where managers do not comply with basic internal controls, e.g. non-adherence to the delegation of authority limits, firm disciplinary action(s) will be considered.

Physical and Information Security

PHYSICAL SECURITY

4.2.14 Mintek will consider conducting a regular detailed review of the physical security arrangements at its offices and improve weaknesses identified. Specific focus areas will be physical security over infrastructure, assets and staff.

INFORMATION SECURITY

4.2.15 Mintek will ensure that all employees are sensitised on a regular basis to the fraud and corruption risks associated with information security and the utilisation of computer resources, in particular – access control, and ensure that systems are developed to limit the risk of manipulation of computer data.

4.2.16 Regular communiqués will be forwarded to employees pointing security policy, with a particular emphasis on e-mail and Internet usage and the implications (e.g. disciplinary action) of abusing these and other computer related facilities. Where employees are found to have infringed on prevailing policy in this regard, disciplinary action will be taken.

4.2.17 Regular reviews of information and computer security will also be considered. Weaknesses identified during these reviews will be addressed.

5. DETECTING AND INVESTIGATING FRAUD AND CORRUPTION

5.1 Internal Audit

5.1.1 Mintek recognises the fact that the positive support by all its managers for Internal Audit and its functions, speedy response to, and the addressing of queries raised by Internal Audit is vital to the success of the Plan. Where managers are found to be slow in addressing internal control queries raised by Internal Audit, firm action will be taken.

5.1.2 Mintek will regularly re-emphasise to all managers that consistent compliance by employees with internal control is one of the fundamental controls in place to prevent fraud and corruption. Managers will be encouraged to recognise that internal control shortcomings identified during the course of audits are, in many instances, purely symptoms and that they should strive to identify and address the causes of these internal control weaknesses, in addition to addressing the control weaknesses.

5.1.3 Awareness strategies will also be developed to enhance managers' understanding of the role of Internal Audit.

5.2 Ongoing Risk Assessment and Management

5.2.1 Acknowledging the fact that Mintek faces diverse business risks from both internal and external sources, Mintek is administrating an ongoing process of risk identification and risk management. This information will be used to assist management with the following:

(a) Prioritising areas for attention and subsequently developing appropriate controls to limit the material risks identified; and

(b) To enable management to continually assess and update the risk profile (incorporating fraud and corruption risk) of Mintek.

5.2.2 Presentations to employees of Mintek will be conducted in order to ensure that they have a more detailed understanding of the fraud and corruption risks facing Mintek and the areas wherein these risks exist, thus enhancing the prospect of detecting irregularities earlier.

5.2.3 Mintek will also consider performing specific fraud and corruption detection reviews in the following areas on a regular basis:

- Asset and inventory management;
- Procurement/Supply Chain Management;
- Conflicts of interest;
- Project management and maintenance;
- Contracts management;
- Fleet management;
- Compliance to delegations of authority;
- Budget control;
- Creditor payments;
- Revenue management;
- Payroll;
- Travel and subsistence; and
- Human Resources.

This will include the conducting of presentations to managers and staff to ensure that they have a more detailed understanding of the fraud and corruption risks associated with these areas, thus also enhancing the prospect of detecting irregularities earlier.

5.3 Reporting and Monitoring

5.3.1 Mintek has implemented a Fraud Hotline, which is controlled by an independent service provider and is intended to achieve the following:

(a) To deter potential fraudsters and corrupt individuals by making all employees and other stakeholders aware that Mintek is not a soft target, as well as encouraging the participation of employees in supporting, and making use of this facility;

(b) To raise the level of awareness that Mintek is serious about fraud and corruption;

(c) To detect incidents of fraud and corruption by encouraging whistle blowers to report incidents which they witness;

(d) To assist Mintek in managing the requirements of the Protected Disclosures Act by creating an additional channel through which whistle blowers can report irregularities which they witness or which come to their attention; and

(e) To further assist Mintek in identifying areas of fraud and corruption risk in order that preventive and detective controls can be appropriately improved or developed.

5.3.2 Mintek will ensure that a fraud and corruption information system is developed for the following purposes:

(a) Recording all allegations;

(b) Tracking progress of investigation of allegations;

(c) To facilitate the early identification of systemic weaknesses and recurring risks, and inform managers and employees of systemic weaknesses/risks;

(d) Provide feedback to employees and other whistle blowers on the management of allegations;

The Fraud Policy and Response Plan:

5.3.3 A Fraud Policy, which contains the policy stance of Mintek to fraud and corruption as well as the response mechanisms in place to report, investigate and resolve incidents of fraud and corruption which impact it, has been developed for Mintek.

5.3.4 The Fraud Policy will be circulated to all employees of Mintek and appropriate sections to the public and providers of goods and services.

5.3.5 Fraud and corruption must be reported according to the provisions of the fraud policy.

6. FURTHER IMPLEMENTATION AND MAINTENANCE

6.1 Creating awareness
This component of the Plan comprises two approaches, namely education and communication.

6.1.1 **Education**: The creation of awareness amongst employees is intended to address the following issues:

(a) Informing employees on an ongoing basis on what constitutes fraud and corruption;

(b) Promote Mintek's and national policies that must be adhered to;

(c) Informing employees of fraud and corruption risks to enable understanding of specific risks to which Mintek may be exposed, thus enhancing the prospect of detecting irregularities earlier;

(d) Encouraging employees to blow the whistle on fraud and corruption;

(e) Employee awareness of the current legislative framework as it relates to fraud and corruption, and their obligations and rights should they blow the whistle on fraud and corruption, the nature of the witness protection system and the roles and responsibilities of existing anti-corruption institutions; and

(f) Inform employees of their obligations and rights in terms of the Access to Information Act.

6.1.2 **Communication**: The objective of the communication approaches is to also create awareness amongst employees, the public and other stakeholders, of the Plan in order to facilitate a culture where all stakeholders strive to contribute toward making the Plan a success as well as for the sustaining of a positive, ethical culture within Mintek. This will increase the prospect of fraud and corruption being reported and improve Mintek's prevention and detection ability.

6.1.3 Communication strategies that will be considered by Mintek are the following:

(a) Posters, newsletters, pamphlets and other publications to advertise the Code and the Fraud Policy, aimed at employees, the public and other stakeholders;
(b) Screensavers on computers with appropriate anti-fraud and corruption and pro-ethics messages;
(c) Attachments to tender invitation documents relating to Mintek's stance to fraud and corruption, where such irregularities can be reported and the actions which will be considered;
(d) Appropriate attachments to offers of employment and inclusion of appropriate items in induction and training programmes;
(e) Prudent terms in contracts signed with providers of goods and/or services relating to offering of gifts to employees of Mintek;

(f) Ensuring that fraud and corruption prevention is a fixed agenda item in meetings;
(g) Signing of declarations of commitment by all employees to the Plan; and
(h) Endorsements of correspondence directed at providers of goods and/or services with anti-fraud and corruption and pro-ethics messages.

6.2 Ongoing Maintenance and Review

6.2.1 The Chief Executive Officer will be responsible for ensuring the ongoing maintenance and review of the Plan. This includes appointing appropriate officials to ensure that:

(a) Reports of fraud and corruption received are evaluated and highlight areas of fraud and corruption risk within Mintek;

(b) Fraud and corruption threats to Mintek are considered and recommendations to appropriate committees or management are made;

(c) Criminal activities threatening Mintek are considered and fraud and corruption prevention recommendations with regard to areas that should be examined are made;

(d) Action taken to implement recommendations relating to incidents of fraud and corruption are monitored;

(e) The Code and the Fraud Policy are reviewed and appropriate amendments are made;

(f) The awareness programme as necessary is amended, and the changes are implemented; and

(g) Ongoing communication and implementation strategies are developed and implemented.

6.2.2 The Plan will be reviewed as the risk profile of Mintek changes, whilst progress with the implementation of the various components will be reviewed regularly. In the latter regard, specific priorities stemming from the Plan, actions to be taken, responsible persons and feedback dates relating to progress made will also be set.

APPENDIX III – GOVERNANCE STRUCTURE

BOARD OF DIRECTORS (NON-EXECUTIVE)

NAMES	POSITION	GENDER	RACE	QUALIFICATIONS	AREAS OF EXPERTISE	OTHER BOARD MEMBERSHIPS
Linda Makatini	Chief Executive Officer: Ngwane Mining	Female	African	LLM International Law; BA Law (LLB)	Law; Business and Strategy Consulting	Jacob Zuma Educational Trust
Derick Jeffrey Block	Management Consultant	Male	Coloured	LL.B, B. Iuris , H Dip Tax	Corporate Governance, Legal & Ethics, Compliance, Risk Management	Member of South African Veterinary Council and Member of South African Weather Service
Catherine Leso	Chief Information Officer: Department of Mineral Resources	Female	African	BTech in Business Administration, NDip in Information Technology	ICT technologist and portfolio management in financial services & automobile sector.	None
Khomotso Ramasela Mthimunye	Managing Partner: KR Mthimunye CA (SA)	Female	African	B.Compt (Hons); B.Com; Higher Diploma in Tax Law; Chartered Accountant (SA)	Finance; Accounting; Auditing; Strategy and Business Development	Member of the National Energy Regulator; Board of the Council for GeoScience; Board of Konica Minolta Medical; Cecil Nurse (Pty) Ltd; Ditulo Office (Pty) Ltd; Develop SA; OCESA; Hatfield Group; Member of SAICA, Independent Regulatory Board of Auditors and Investment Analyst Society
Chris Nhlapo	Deputy Vice-Chancellor: Cape Peninsula University of Technology	Male	African	PhD; M.Sc; Hons. B.Sc; HEd	Business Administration; Research and Development; Chemistry; Project Management; Innovation	Member of the SA Chemical Institute; Member of the Macromolecular Society of SA; Member of the Catalysis Association of SA; Member of the National Committee for IUPAC; Board member of World Design Capital (WDC); Board member, CHEC; Member of CPUT Council; Chairperson, Cape Higher Education Consortium (CHEC), Executive Commitee member SANORD
Imraan Ebrahim Patel	Deputy Director General: Department of Science and Technology	Male	Indian	BSc Hons; PDM: PPDA	Science Policy, Public Management	Southern African Science Service Centre on Climate Change and Adaptive Land Management (SASSCAL)
Vuyelwa Toni Penxa	Managing Director: Iingcaphephe Metallurgical Services	Female	African	PhD in Public Affairs; MSc in Science Education; BSc; P.D.E; BEd	Analytical Sciences; Biotechnology; Business Administration	Deputy Chairperson of the South African Qualifications Authority (SAQA) Board; Trustee of the Red Meat Industry Trust
Nompumelelo Zikalala	Senior Vice President: De Beers Sightholder Sales SA	Female	African	BSc Chem Eng	Mining; General Management; Corporate Governance and Strategy	Chairperson of Ponahalo/De Beers Equal Allocation Trust; Board Member of De Beers Consolidated Mines and De Beers Sightholder Sales South Africa; Board Member of Ponahalo Holdings

MINTEK EXECUTIVE MANAGEMENT TEAM							
NAMES	**POSITION**	**GENDER**	**RACE**	**QUALIFICATIONS**	**YEARS OF SERVICE AT MINTEK**	**AREAS OF EXPERTISE**	**BOARD MEMBERSHIPS**
Abiel Mngomezulu	CEO	Male	African	MSc Engineering (Mining), BSc Hons (Geology)	8 Years	Engineering (Mining), Business Management Mineral Economics	African Exploration, Mining and Finance Company, MINDEV (Pty) LTD, Merafe Resources Ltd
Sakhi Simelane	GM: Finance	Male	African	MBA, BCom Hons (Auditing), BCom	7 Years	Finance and Auditing. General Management	Unisa Council, National Department of Economic Development (EDD), Public Service Commission (Audit Committee), MINDEV (Pty) LTD
Gugulethu Nyanda	GM: Corporate Services	Female	African	BPaed, BA Hons; Dip. HRM	2.5 Years	Human Resources Management, Strategic Planning, Communication, Integrity & Compliance Management and General Management	None
Peter Craven	GM: Business Development	Male	White	BSc (Chem Eng), Professional Eng, Chartered Eng; MIChE, MSAIMM	13 Years	Management of commercial operations, Large Construction Projects, Strategic R&D Programmes and Technology Commercialisation	None
Alan McKenzie	GM: Technology	Male	White	MSc, BSc Hons	23 years	Pyrometallurgy, Mineral Processing and General Management	None
Makhapa Makhafola	GM: Research & Development	Male	African	PhD (Analytical Chemistry), MSc, Post-Graduate Diploma in Project Management, BSc Hons, Executive Development Programme	5 Years	Analytical Chemistry, Quality Assurance and General Management	Board Member of the Centre of Excellence in Strong Materials. Chairperson of the Karoo Centre for Human Rights.

APPENDIX IV – RISK MANAGEMENT POLICY

1. Legal Mandate

Mintek is classified in terms of The Public Finance Management Act (PFMA), 1999, as a Schedule 3 Public Entity. The following sections of the PFMA are relevant to this Risk Management Policy:

Section	Description
49 (1)	Every public entity must have an authority which must be accountable for the purposes of this Act.
(2)	If the public entity has a board or other controlling body, that board or controlling body is the accounting authority for that entity.
51 (1)	An accounting authority for a public entity –
(a)	must ensure that public entity has and maintains –
(i)	effective, efficient and transparent systems of financial and risk management and internal controls;
(ii)	a system of internal audit under the control of an audit committee.
56 (1)	The accounting authority for a public entity may –
(a)	in writing delegate any of the powers entrusted or delegated to the accounting authority in terms of this Act, to an official in that public entity.
(2)	A delegation or instruction to an official in terms of subsection (1) –
(b)	may either be to a specific individual or to the holder of a specific post in the relevant public entity; and
(c)	Does not divest the accounting authority of the delegated power or the performance of the assigned duty.

In terms of the above, the Mintek Board delegates the duties of risk management to the General Manager: Business Development, who will, hereafter, be referred to as the Risk Management Officer (RMO). A model for the governing structures responsible for the management of risk in Mintek is illustrated in Figure 1.

2 Corporate Governance

'Corporate governance' is the system by which an organisation is directed and controlled at its most senior levels, in order to achieve its objectives and meet the necessary standards of accountability, probity and openness.

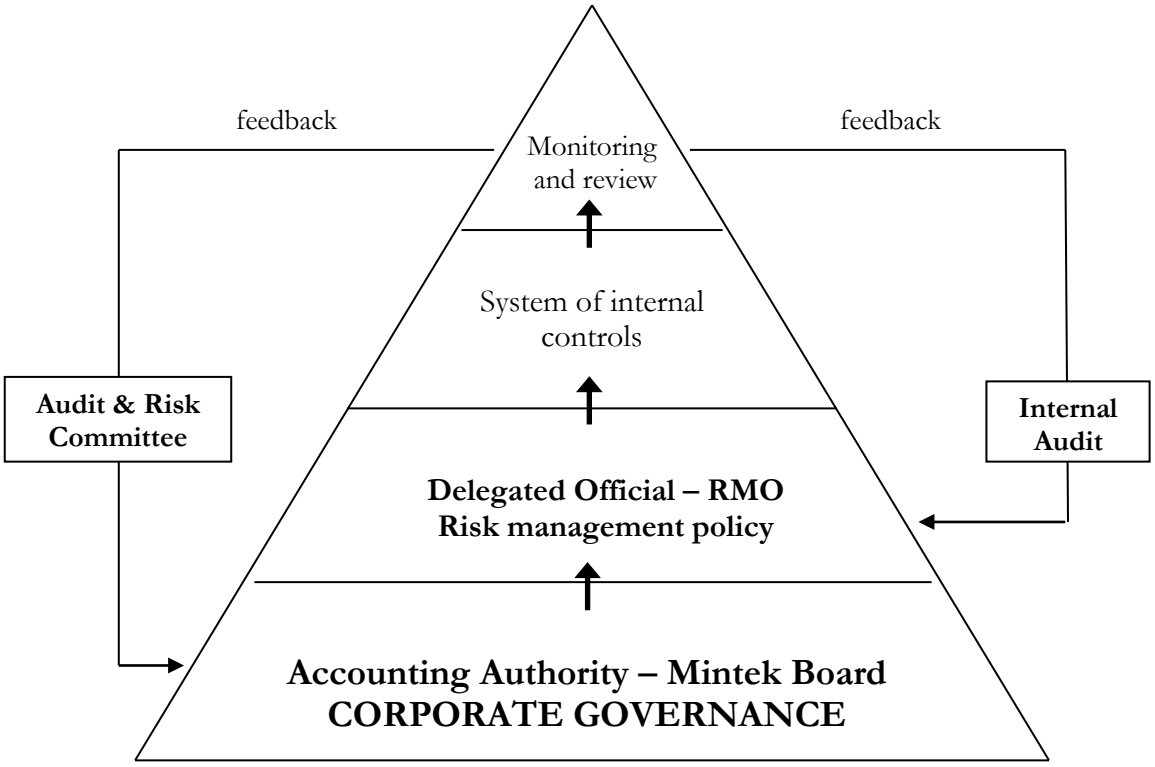


FIGURE 1. Governing structure for the management of risk (RMO is the Risk Management Officer)

Demand for improved corporate governance has grown over the last decade. This has led to a body of guidance on corporate governance, including risk management and internal control. A set of responsibilities must be established in order to cascade the governance requirements down into Mintek. These responsibilities cover:

a. Establishing an appropriate accountability framework encompassing management structures and practices (leadership, committees, reporting arrangements, policies and strategies etc.) within which the system of internal control can operate.

b. Ensuring that the core and supporting processes are in place to produce the desired outcome (including a risk management process).

c. Having the necessary capability (leadership, knowledgeable and skilled staff and adequate financial and physical resources) to ensure the processes and internal controls can work effectively.

d. Regularly monitoring and reviewing the system of internal control.

e. Ensuring proper communication and consultation at all levels within Mintek and with external stakeholders.

f. Obtaining sufficient independent and objective assurance as to the robustness of Mintek's key processes.

The Board fully accepts its responsibility to discharge these governance obligations, including the management of risk. In order to deliver its accountability responsibilities, the Board has agreed a risk management policy that sets out its approach to risk management and the context for the system of internal control.

3 Risk Implementation Plan

Mintek is encouraged to adopt well managed risk-taking. It therefore needs to have in place the skills, management arrangements, and organisational structures to take advantage of opportunities to do things better and to reduce the possibility of failing to achieve key objectives. This document defines Mintek's approach to risk and how risk management will be embedded into management processes to ensure that the key strategic risks are being effectively managed.

Risk management needs to allow for the effective assessment and exploitation of opportunities while also identifying what would prevent us from achieving our objectives, and ensuring we have in place procedures to minimise, or manage, those risks. Risk management therefore involves a planned and systematic approach to the identification, assessment and mitigation of the risks which could hinder the achievement of strategic objectives.

3.1 The Role of the Risk Steering Committee

The Risk Management Officer (RMO) is responsible, on behalf of the Board, for ensuring that Mintek has an effective and operational system for managing risks. All types of high-level risk will be covered. The effectiveness of the system will be reviewed on a regular basis. The RMO will constitute a Risk Steering Committee with the following members:

- Chairman (RMO)
- Chief Executive Officer
- General Manager: Finance
- General Manager: Technology
- General Manager: Research & Development
- General Manager: Corporate Services
- Manager: Finance
- Manager: Human Resources Division
- Manager: Estate Management Services
- Head: Information Technology
- Head: Security
- Head: Safety & Environment

The Committee may, at their discretion, co-opt other participants with specialised knowledge or skills to attend any meeting. The key activities of the Risk Steering Committee will be to:

- identify the key strategic risks that would prevent achievement of Mintek's objectives;
- assign ownership of specific identifiable risks;
- evaluate the significance of each risk;
- assess Mintek's risk appetite;
- identify suitable responses and mitigating actions to each risk;
- ensure that the internal control system helps manage the risks;
- regularly review the Risk Management Policy and the Risk Implementation Plan.

Copies of the Minutes of each meeting of the Risk Steering Committee, together with the latest version of the Risk Management Policy and the Risk Implementation Plan, will be submitted to the Audit and Risk Committee for discussion. Any comments received will be incorporated into the documents and submitted to the Mintek Board for approval.

Running in tandem with the Risk Steering Committee is Mintek's corporate quality, environmental, and safety management programs. Mintek has been certified compliant with ISO 9001: 2000, ISO 14001: 2004, and OHSAS 18001: 2007. The identification of technical risks, the implementation of appropriate risk mitigation measures, and continuous improvement is an integral part of these management programs. Mintek is audited annually by external auditors, SGS South Africa (Pty) Ltd, who check for consistency, compliance, and conformity with the international standards.

A meeting of the Corporate Safety Committee is held four times per year, whereas the Corporate Quality and Corporate Environmental committees meet twice per year. The Chairman of these committees, (viz. the General Manager: Technology) is also a permanent member of the Risk Steering Committee, thereby ensuring effective communication between these bodies.

3.2 Critical Success Factors

In order to assess the adequacy and success of our approach to risk management a number of critical success factors have been identified:

- senior management support, own, and lead on risk management;
- risk management policies and the benefits of effective management are clearly communicated to all staff;
- the organisational culture supports well thought through risk taking and innovation;
- management of risk is fully embedded in management processes and consistently applied;
- management of risk is closely linked to achievement of objectives;
- risks associated with working with other organisations are assessed and managed;
- risks are actively monitored and regularly reviewed.

3.3 Risk Identification

A strategic approach to risk management depends on identifying risks against key organisational objectives. Operating within this framework helps ensure a consistent approach across the organisation and enables a clear structure to be established.

The mandate of Mintek is set out in the Mineral Technology Act (Act No. 30 of 1989), which 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.

The vision of Mintek is to be a global leader in mineral and metallurgical innovation.

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

In order to support the mission the Mintek Board will, from time to time, identify Strategic Objectives for the guidance of Management. These Strategic Objectives will be expanded further into Targeted Activities (TAs) to aid the identification of risks.

The Strategic Objectives and TAs will be listed in the Risk Implementation Plan. Mintek will identify the risks relevant to these TAs, which forms the basis of Mintek's Risk Implementation Plan (copy appended), and each risk is cross-referenced to one or more of these TAs.

3.4 Evaluating the significance of each risk

Mintek has followed the method outlined by National Treasury in their document "Final Risk Management Framework" for the Public Sector for assessing the significance of each risk. The significance, or rating, of risk is a combination of impact multiplied by probability. A system of risk rating can be created by assessing the impact and probability of every risk on a 10 point scale. Such a system results in a 1 to 100 scale, where a score of 1 is indicative of an insignificant risk, and 100 would indicate a potentially catastrophic risk.

The best quantitative criterion for assessing risk is to calculate the financial value of the occurrence. This provides the guideline basis for the risk rating in the table above. However, sometimes there are consequences which cannot be quantitatively reduced to a financial value. Examples include major reputational set-backs, loss of life, decrease in staff morale, etc. All these consequences should be taken into account in determining the impact of the occurrence and corresponding risk rating – the economic impact is only one criterion. The following tables are to be used to assist management in quantifying the potential that a risk exposure may have on the organisation:

Rating	Title	Description of Impact
9-10	Catastrophic/ fundamental	Disaster with the potential to significantly harm the business and is fundamental to the non-achievement of objectives.
7-8	Critical	Critical event which can be endured but which may have a prolonged negative impact and extensive consequences.
5-6	Serious	Major events which can be managed but requires additional resources and management effort.
3-4	Significant	Event which can be managed under normal operating conditions.
1-2	Minor	Not worth worrying about.

Rating	Title	Description of Probability
9-10	Almost Certain	The event is expected to occur in most circumstances.
7-8	Likely	The event will probably occur in most circumstances.
5-6	Moderate	The event should occur at some time.
3-4	Unlikely	The event could occur at some time.
1-2	Rare	The event may occur in exceptional circumstances.

The economic impact of an identified risk includes both the direct cost of the event associated with the risk occurring (e.g. the cost of repairs after a fire) and the indirect costs that are a consequence of the event (e.g. the loss of production and income while the repairs are taking place).

Most of the risks in a business environment are controllable, so that the probability of a risk actually occurring is dependent upon the effectiveness of the control measures in place. Added value is therefore to be gained by estimating

the probability of each risk before and after the implementation of suitable control measures, resulting in the assessed inherent and controlled risk.

The assessment of the potential impact of Mintek's risks and their associated probabilities are determined by the members of Mintek's Risk Steering Committee. The assessment process is designed to be as objective and quantitative as possible, but still contains a degree of judgement. Some risks will be connected to, or dependent upon, other risks. It is important to understand the relationships between risks so that they can be effectively prioritised. The table below places the risk rating in an economic framework:

Risk rating	Qualitative assessment	Economic assessment
70-100	Catastrophic	>R150m
50-69	High	R60m – R150m
35-49	Medium-high	R20m – R60m
24-34	Medium	R7.5m – R20m
15-23	Low-medium	R1.5m – R7.5m
1-14	Low	<R1.5m

All risks that are determined as having a rating in excess of 15 (greater than R1 million) will be identified and recorded for future monitoring and control, and is in line with Mintek's Materiality Framework.

Management response to each risk:

Having identified the key strategic risks, the Risk Steering Committee will consider the different ways that Mintek can respond to these risks, and the responses will be recorded in the Risk Implementation Plan. The options for responses include:

- ***avoiding*** the risk by not starting the activity that creates exposure to the risk;
- ***mitigating*** the risk through improvements to the control environment (risk treatment may include methods, procedures, applications, management systems, and the use of appropriate resources that reduce the probability or possible severity of the risk);
- ***transferring*** the risk exposure, usually to a third party better able to manage the risk, e.g. through insurance or outsourcing;
- ***exploiting*** the risk, where the risk exposure represents a potential missed or poorly-realised opportunity;
- ***terminating*** the activity that gives rise to the intolerable risk; and
- ***integrating*** some or all of the risk responses outlined above.

3.5 Assigning ownership

Having identified the key strategic risks, the responsibility for managing them must be allocated. Whereas the Chief Executive Officer remains personally accountable for the organisation as a whole and for its risk management, a framework of senior level delegation of the key risks is essential to effective risk management. The delegation of responsibility has been effected in the Risk Implementation Plan by assigning ownership of every risk element to an appropriate position in Mintek.

3.6 Risk appetite

The main focus of private sector risk management is on maintaining and enhancing profitability. In contrast, the public sector focuses on the fulfilment of objectives and delivery of a beneficial outcome in the public interest. Mintek, as a Schedule 3 Public Entity, is positioned between the private and public sectors.

Mintek must adopt well-managed risk taking where it is likely to lead to improvements in service delivery. It is recognised that risk taking is essential if Mintek is to innovate and improve. Mintek's risk appetite is reflected in our strategic objectives. Our overall portfolio of risks must be balanced to ensure, as far as possible, that the mix of risks remains tolerable.

3.7 Control assurance sources

Having identified the key risks, we have then considered how we manage them to reduce their probability or impact, should they occur. The control assurance sources available to Mintek are listed below, and each identified risk in the Risk Implementation Plan is cross-referenced to one or more of these sources:

- Internal audit
- ISO 9001 internal audits
- ISO 9001 external audits
- ISO 14001 internal audits
- ISO 14001 external audits
- OHSAS 18001 internal audits
- OHSAS 18001 external audits
- Legal compliance audits
- GMR(2) inspections
- Workplace inspections
- IT Steering Committee reviews
- SAP project steering committee
- Security audits
- Wellness Committee reviews

4. System of Internal Control

A control is any action or procedure performed by management to increase the likelihood of activities achieving their objectives. In other words, control is a response to risk, either to contain the risk to an acceptable level or to increase the likelihood of a desirable outcome.

A system of internal control provides a framework for all processes and activities designed to give reasonable assurance regarding achievement of objectives. Such systems should be designed to manage, rather than eliminate, the risk of failure. Controls are broken down into three categories:

Operational:	relating to the effective and efficient use of resources
Financial:	relating to the proper management and oversight of the organisation's finances, leading to the preparation of reliable published financial statements
Compliance:	relating to compliance with applicable laws and regulations

The Chief Executive Officer participates in the exercise of many of the key internal controls or, through participation in activities, sees evidence of their existence and operation. In addition the Chief Executive Officer receives confirmation from the Council's General Managers and others that the controls are working effectively.

5. Monitoring and Review

Because risk management is explicitly linked to the achievement of objectives, reporting will be embedded within the regular processes for reporting on our operating performance. The monitoring and reporting of risks is therefore linked to the operating plan and budget cycle.

The Risk Steering Committee will meet four times per year. The minutes of these meetings, and any review or update of any of the risk documentation, will be included in the pack of documents submitted to members of the Audit and Risk Committee and the Mintek Board at least two weeks prior to the date of the meeting.

6. Roles and Responsibilities

6.1 The Board and Audit and Risk Committee

As the Accounting Authority in terms of the PFMA, the Board has a fundamental role in the management of risk. It will:

- receive an opinion from the Audit and Risk Committee that will include its review of the processes of risk management and internal control;
- consider risk issues as they affect Board decisions;
- review key strategic risks that will be analysed annually alongside the strategic plan;
- periodically review risks as part of the monitoring of the annual operating plan.

6.2 The Chief Executive Officer

The Chief Executive Officer remains ultimately accountable for the organisation and its management of risk. He must:

- have a clear understanding and assessment of the risks that could prevent delivery of objectives;
- ensure that the organisation has effective risk management and control processes;
- be provided with assurance that the processes and the key strategic risks are being effectively managed.

As part of this process the Chief Executive Officer must undertake an annual review of the effectiveness of the system of internal control, which will enable the appropriate statement to be made in Mintek's annual accounts.

6.3 Executive Management

Mintek's General Managers have a key role in facilitating the flow of information from the Board to staff and vice versa. They should:

- report to the Chief Executive Officer on key strategic risks as and when necessary;
- discuss the findings of internal and external audits and implement changes as appropriate;
- take responsibility for the risks that relate to the objectives of their line management;
- ensure that all Board papers identify impact on strategic risks;
- promote a consistent approach within Mintek with respect to risk management;
- act as mentors to all employees and promote a risk awareness culture.

6.4 Risk Management Officer (RMO)

The RMO is responsible for:

- facilitating the identification of key strategic risks and controls mechanisms;
- establishing and co-ordinating Mintek's action plan for implementing appropriate risk reduction management;
- integrating Mintek's ISO 9001, 14001, and OHSAS 18001 quality, environmental, and occupational health / safety management systems into the Risk Management Policy;
- promoting risk awareness and skills in risk assessment and reporting.

6.5 All employees

All staff should be aware of, and understand, the Mintek's Risk Management Policy, the policies on risk, and how these apply to their own roles and responsibilities. In particular, project managers need to understand and manage the risks relating to their activities and the impact on Mintek's key strategic risks.

APPENDIX V – RISK PLAN

Mintek has identified five Strategic Objectives to support Mintek's Mission. These Strategic Objectives, in accordance with the requirements of the Risk Management Policy, have been expanded further into Targeted Activities (TA's) to aid the identification of risks.

Strategic Objective 1: Enhance Mintek's visibility and credibility to all stakeholders by implementing an integrated marketing and communication function;

(i) Broaden Mintek's local and international marketing footprints;

(ii) Improve interaction with key stakeholders, and develop suitable intervention strategies;

(iii) Improve quality of service and response time.

Strategic Objective 2: Research and develop efficient mineral processing technologies and value added products and services in order to, amongst others, strengthen Mintek's position as a global supplier of efficient and environmentally-sustainable mineral-processing technologies, equipment, process design and control-optimisation systems;

(iv) Identify, and respond to, the needs of Mintek's clients (public and private) with innovative technologies, services, and products;

Strategic Objective 3: Promote the mineral-based economies of rural and marginalised communities through technical assistance and skills development by developing technologies appropriate to the local jewellery, artisanal and small scale mining industries with the aim of expanding the industry and of lowering entry barriers. Initiate poverty alleviation programmes and support the growth of Small, Medium and Micro Enterprises (SMMEs) in the mineral sector;

(v) Create business opportunities for SMMEs;

Strategic Objective 4: Uphold good governance practices that comply with applicable national and international regulatory frameworks and standards, maintain fiscal discipline, and enhance organisational efficiencies;

(vi) Prudent financial management of Mintek's investments & liabilities;

(vii) Implementation of effective financial controls;

(viii) Maintain the integrity of IT and financial systems;

(ix) Maintain effective safety and environmental programs, and reduce Mintek's Lost Time Injury Frequency Rate to below 1,0;

(x) Where appropriate, leverage Mintek technology into business opportunities via Mindev;

(xi) Protect and maintain returns from Mintek's Intellectual Property;

(xii) Maintain the effectiveness of Mintek's technical assets and infrastructure.

Strategic Objective 5: Build world class R&D excellence whilst transforming internal and external business processes and the workforce profile to ensure that it is in line with the socio-economic realities of South Africa today, whilst ensuring broad representation of diverse cultures and people.

(xiii) Improve Mintek's succession and internal transformation processes;

(xiv) Continual on-the-job training and multi-skilling

Mintek will identify the risks relevant to these TAs. The Strategic Objectives and TAs will be listed in the Risk Implementation Plan. Further evaluation of these risks forms the basis of Mintek's Risk Implementation Plan (copy appended), and each risk is cross-referenced to one or more of these TAs.

Evaluating the significance of each risk

Mintek has followed the method outlined by National Treasury in their document "Final Risk Management Framework" for the Public Sector for assessing the significance of each risk. The significance, or rating, of risk is a combination of impact multiplied by probability. A system of risk rating can be created by assessing the impact and probability of every risk on a 10 point scale. Such a system results in a 1 to 100 scale, where a score of 1 is indicative of an insignificant risk, and 100 would indicate a potentially catastrophic risk.
The following tables are to be used to assist management in quantifying the potential that a risk exposure may have on the organisation:

Rating	Title	Description of Impact
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The economic impact of an identified risk includes both the direct cost of the event associated with the risk occurring (e.g. the cost of repairs after a fire) and the indirect costs that are a consequence of the event (e.g. the loss of production and income while the repairs are taking place).

Most of the risks in a business environment are controllable, so that the probability of a risk actually occurring is dependent upon the effectiveness of the control measures in place. Added value is therefore to be gained by estimating the probability of each risk before and after the implementation of suitable control measures, resulting in the assessed inherent and controlled risk.

The assessment of the potential impact of Mintek's risks and their associated probabilities are determined by the members of Mintek's Risk Steering Committee. The assessment process is designed to be as objective and quantitative as possible, but still contains a degree of judgement. Some risks will be connected to, or dependent upon, other risks. It is important to understand the relationships between risks so that they can be effectively prioritised. The table below places the risk rating in an economic framework:

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1-14	Low	<R1,5m

All risks that are determined as having a rating in excess of 15 (greater than R1,5 million) will be identified and recorded for future monitoring and control. This is in line with Mintek's Materiality Framework.

Management response to each risk

Having identified the key strategic risks, the Risk Steering Committee will consider the different ways that Mintek can respond to these risks, and the responses will be recorded in the Risk Implementation Plan. The options for responses include:

- ***avoiding*** the risk by not starting the activity that creates exposure to the risk;
- ***mitigating*** the risk through improvements to the control environment (risk treatment may include methods, procedures, applications, management systems, and the use of appropriate resources that reduce the probability or possible severity of the risk);
- ***transferring*** the risk exposure, usually to a third party better able to manage the risk, e.g. through insurance or outsourcing;
- ***exploiting*** the risk, where the risk exposure represents a potential missed or poorly-realised opportunity;
- ***terminating*** the activity that gives rise to the intolerable risk; and
- ***integrating*** some or all of the risk responses outlined above.

Mintek's Risk Implementation Plan: an assessment of Mintek's major risks

#	Risk classification Risk owner Risk Category	Description of Risk	Risk reduction measures	Before			After			Present status of risk reduction measures	Targeted Activity (The Roman numerals refer to the Targeted Activities associated with Mintek's Strategic Objectives, as listed in the beginning of this document)	Control assurance
				Risk Rating	Impact	Probability	Risk Rating	Impact	Probability			
1	**Business risk** Executive management **Strategic Risk**	Loss of revenue due to the business environment. Management response: **Mitigate**	• Ensure top quality control of all products and services • Timely delivery of all products and services • Ensure competitive pricing • Good maintenance backup and/or after sale customer care • Adequate business planning • Maximise alternative revenue streams • Ensuring adequate marketing • Keeping customers happy (client surveys) • Improving productivity without compromising quality • Focus should be on sharing of resources as well as where it is mostly needed • Freeze recruitment where appropriate • Science vote cluster discussions –focus on projects that Mintek can really benefit from (short-term)	48	6	8	48	6	8	**Adequate**	iv Identify, and respond to, the needs of Mintek's clients (public and private) with innovative technologies, services, and products xiv Continual on-the-job training and multi-skilling iii Improve quality of service and response time vii Implementation of effective financial controls	• Internal audit • ISO 9001 internal audits • ISO 9001 external audits
2	**Physical and operational risks** **GM Finance Manager: EMS** **Operational Risk**	Loss of external electrical power e.g. loss of power from City Power's infrastructure, load shedding from Eskom. Management response: **Mitigate**	• Mintek has a 250kVA, a 350 kVA, a 500kVA, 2 x 700kVA, and a 750kVA power generator to ensure adequate emergency power • SBU's emergency power requirements have been analysed. The outcome of this exercise provided information on MIntek's UPS and emergency • generator requirements • Design and configure an internal integrated emergency power grid to maximize loading of E-power plants	48	8	6	42	7	6	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure	▪ Routine inspections
3	**Human resource risk** Executive Management GM Corp services Managers SBU Manager: HRD **Strategic Risk**	Failure to attract and retain skilled personnel. Management response: **Mitigate**	• Constant monitoring of best practice strategies for attraction and retention of skilled personnel • Annual performance appraisals conducted on all employees to identify necessary skills for accelerated development • Coaching and Mentoring program • Succession planning • Benchmark salary scales against industry and comparable entities • Exit interview process introduced to determine the reasons for staff resigning from Mintek	42	7	6	42	7	6	**Adequate**	xiii Improve Mintek's succession and internal transformation processes xiv Continual on-the-job training and multi-skilling	• Internal audit
4	**Physical and operational risks** GM Technology Head: Corp. SHEQ Manager: EMS **Operational Risk**	Major fire or explosion causes destruction of building and equipment, and /or injuries to employees. Management response: **Mitigate**	• Firefighting equipment is serviced once a year • Emergency response and evacuation procedures (including site evacuation) are in place • Training of staff on emergency response and evacuation procedures • The emergency response and evacuation procedures officially tested three times per year • Fire-fighting and first aid courses for relevant personnel • Three yearly fire risk assessments performed by the Fire Protection Association • Ensure detailed documentation is readily available on hazardous agents in inventory to be	70	10	7	40	10	4	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure xiv Continual on-the-job training and multi-skilling ix Maintain effective safety programs	• OHSAS 18001 internal audits • OHSAS 18001 external audits • Legal compliance audit • GMR(2) inspections • Workplace inspections

 All risks are ranked according to the Risk Rating value. The Risk Rating is the product of the Impact and the Probability. The system of risk rating is based on assessing the impact and probability of every risk on a 10 point scale. For impact: 1 = insignificant; 10 = catastrophic. For probability: 1 = extremely unlikely to occur; 10 = will most likely occur. This system results in a 1 to 100 scale for the Risk Rating.

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			utilised by Fire Department • Overall disaster response procedure developed • Embarking in programme with Fire Department to improve Mintek's equipment levels									• Fire risk assessments
5	**Physical and operational risks** **GM Technology** **Head: Corp. SHEQ** **Operational Risk**	Employee exposure to hazardous substances. Management response: Mitigate	• HazChem database, containing updated Material Safety Data Sheets, made available on all computers • Training on safe handling of hazardous materials provided to employees working with hazardous materials • SHEQ briefings and Job Observation conducted • Biological monitoring of employees exposed to hazardous materials • Extraction systems in use, flow rate checked annually • First Aiders trained and available on all shifts • Medical Oxygen available in areas where Cyanide is used • PPE issued to employees • Standard Operating Procedure reviewed annually • Emergency response procedures implemented • Regular occupational hygiene surveys • Elevated incident reporting	72	9	8	32	8	4	**Adequate**	xiv Continual on-the-job training and multi-skilling ix	• OHSAS 18001 internal audits • OHSAS 18001 external audits • Legal compliance audit • GMR(2) inspections • Workplace inspections
6	**Physical and operational risks** GM Finance Manager: EMS **Operational Risk**	Loss of internal electrical power e.g. loss of main transformer. Management response: **Mitigate**	• Mintek has a 250kVA, a 350 kVA, a 500kVA, 2 x 700kVA, and a 750 kVA power generator to ensure adequate emergency power • Monthly maintenance checks on the emergency power generators are done by the electrical department • The cabling has been upgraded to handle 7.9MVA (main incoming supply from City Power) • Those sub-stations around Mintek that are fitted with low Voltage circuit breakers have been upgraded • SBU's emergency power requirements have been analysed. The outcome of this exercise provided information on Mintek's UPS and emergency generator requirements • A program has been implemented in cases where Mintek's power consumption nears the 7.9MVA limit • Annual oil transformer oil test	48	8	6	32	8	4	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure	• ISO 9001 internal audits • ISO 9001 external audits • OHSAS 18001 internal audits • OHSAS 18001 external audits • GMR(2) inspections • Workplace inspections
7	**Physical and operational risks** GM Technology Manager: PDD Manager: HMD Head: Corp. SHEQ **Operational Risk**	Mintek's license to operate scheduled processes suspended or cancelled has a consequence of a major release of hazardous gas or fume (e.g. chlorine). (It is unlikely that Mintek's license would be renewed if this occurred).	• Engineering solutions, gas monitoring, operating procedures and associated training implemented (maintenance of scrubbing systems, online SO2 monitor, replacement for caustic soda with sodium carbonate in scrubbers, airline • Totally enclosed chlorine plant, monitors and interlocks and emergency shutdown and evacuation procedures, airline breathing system • Chlorine cylinders enclosure vented to scrubber, which has adequate capacity and bunded area, is serviced regularly • Bag house and gas monitoring on stacks (at least one accredited check per campaign) • Scrubbers for chlorine and other gases, with pump backups • Chlorine detector after scrubber interlocked to chlorine supply, with battery backup • Fail safe shut-off valve installed on the chlorine manifold	70	10	7	30	10	3	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure xiv Continual on-the-job training and multi-skilling ix Maintain effective safety and environmental programs	• ISO 14001 internal audits • ISO 14001 external audits • OHSAS 18001 internal audits • OHSAS 18001 external audits • Legal compliance audits • GMR(2) inspections • Workplace inspections

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		Management response: **Mitigate**	• Procedures and training of operators by chief investigators and divisional heads; appointment of responsible superintendent in PDD; work permit system; cylinder transport procedures; testing of systems before operation • Overall disaster response procedure implemented • Regular checks and continuous improvements to ensure compliance with higher regulations									
8	**Product risk** GM Technology Managers: SBU **Operational Risk**	Consequential damage caused by Mintek product or process. Management response: **Transfer**	• Covered by contracts and indemnity insurance • Mintek's responsibility for consequential damages caused by Mintek products is specifically excluded in contracts signed with clients • Standard conditions of agreements in use • Special conditions for agreements, which do not fit into the standard contract agreement, in use • Limitation of Liability clauses included in Mintek's "Conditions of Sale" template (available on the intranet) • Adequate quality control during manufacturing process • Subject our products to the necessary certification/accreditation process	45	9	5	30	6	5	**Adequate**	iii Improve quality of service and response time vi Prudent financial management of Mintek's investments & liabilities	• Internal audit • ISO 9001 internal audits • ISO 9001 external audits
9	**Financial risk** Executive Management **Strategic Risk**	Surge in operational costs resulting in loss of profitability. Management response: **Mitigate**	• Comply to accurate and realistic budgeting and implementation thereof • Designed ability to pass through increased costs to customers via change in rates/tariffs • Pro-active management accounting and variance/trend analysis thereon • Regular reviews of pricing policy for Mintek's products and services undertaken • Implementation of bi-annual review of workforce planning. • Adequate business process analysis • Monitor procurement/local content, assembly and fabrication	40	5	8	30	5	6	**Adequate**	vi Prudent financial management of Mintek's investments & liabilities vii Implementation of effective financial controls	• Internal audit
10	**Financial Risks** Executive Management Manager: FIN Managers: SBU **Operational Risk**	Inadequate asset management system. Management response: **Mitigate**	• Review and modify Fixed Assets standard operating procedure and policy, and monitor compliance • Undertake asset audit, document and rectify all anomalies • Developed and implemented asset tagging system aligned to serial numbers of asset • Implementation of a new electronic asset movement system • Improved productivity from implementation of planned maintenance system. • Ensure effective procurement and utilisation of assets	35	5	7	30	5	6	**In Progress**	vii Implementation of effective financial controls xii Maintain the effectiveness of Mintek's technical assets and infrastructure	• Asset verification • Internal Audit
11	**Physical and operational risks** GM Finance Head: ITS **Operational Risk**	Loss of server functionality. Management response: **Mitigate**	• Physical security measures in place, e.g. locked doors, biometric access, motion detection and recording system • Server room fire rated and gas based fire-extinguishing (checked periodically) • Daily backups of user and server data , off-site storage of backup tapes and backup tapes tested on regular basis by doing restores • Regular maintenance checks of server room infrastructure, e.g. air conditioning and UPS • Hardware is readily available from vendors if servers had to be damaged or stolen • Developed and implemented IT disaster recovery process • Dedicated UPS systems with built-in redundancy	56	8	7	25	5	**5**	**Adequate**	viii Maintain the integrity of IT and financial systems xii Maintain the effectiveness of Mintek's technical assets and infrastructure	• IT Steering Committee reviews • Internal audit • ISO 9001 internal audits • ISO 9001 external audits • Security audits • OHSAS 18001 internal audits • OHSAS 18001 external

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				Risk Rating	Impact	Probability	Risk Rating	Impact	Probability			
			• Server virtualization allows for automated migration of a server to another location									audits • GMR(2) inspections • Workplace inspections
12	**Financial Risks** **Executive Management** **Managers: SBU** **Head: Corp. SHEQ** **Fraud Risk**	Adequacy of internal controls to limit fraudulent transactions. Management response: **Mitigate**	• Review all internal controls, reporting systems and procedures on a regular basis • Clearly formalised powers and responsibilities and delegation thereof • Fraud hotline available • Fraud prevention and awareness program • Accounts Payable procedure stipulates requirements for changes made to SAP master data, e.g. supplier bank details	50	5	10	25	5	5	**Adequate**	vii Implementation of effective financial controls	• Internal audit • Fraud hotline
13	**Product risk** GM Technology Head: Corp. SHEQ **Operational Risk**	Foreign laws relating to safety health and or environment transgressed. Management response: **Mitigate**	• Client is made responsible for these items in the contract • Mintek to supply product to meet SA requirements of safety health and environment • When applicable for contracts in foreign countries, this will be handled on a project specific basis. Project Information Chart (PIC) prompts Chief Investigator to state whether foreign laws are applicable	42	7	6	25	5	5	**Adequate**	vi Prudent financial management of Mintek's investments & liabilities ix Maintain effective safety and environmental programs	• ISO 14001 internal audits • ISO 14001 external audits • OHSAS 18001 internal audits • OHSAS 18001 external audits • Legal compliance audits • ISO 9001 internal audits • ISO 9001 external audits • Legal compliance audits
14	**Product risk** GM Technology GM: R&D **Operational Risk**	Loss of product while being delivered to client, late delivery penalties etc. Management response: **Transfer**	• Ensure goods are adequately insured on a project specific basis. "All risk" insurance required for high value items, e.g. plant • Mintek's All Risk Policy provides some cover	40	8	5	25	5	5	**Adequate**	vii Implementation of effective financial controls	• Internal audit
15	**Physical and Operational risk** GM Technology Head: Corp. SHEQ **Operational Risk**	Spillage of materials containing natural radioactive elements e.g. uranium and/or thorium causing an unfavorable public response. This can cause the loss of major clients. Management response: **Mitigate**	• Public communication procedure (Emergency Response Procedure) developed to deal with communication aspects involved in the case of any spillages, or gas releases, affecting the public • Mintek only use transporters approved by the National Nuclear Regulator. Mintek's responsibility w.r.t. this issue must be investigated • Emergency response plan developed to respond to accidents both at Mintek and associated with the transporting of Radioactive Material which may give rise to a risk of nuclear damage • Appointment of Radiation Protection Officer to ensure that the transporting of Radioactive Material is done according to the Regulations for the Safe Transport of Radioactive Material. (International Atomic Energy Agency TS-R-1) • All work on Radioactive Material done in a designated area. Samples are kept in a physically secure area that will prevent unauthorised access and the unauthorised removal of such material	64	8	8	24	6	4	**Adequate**	vii Implementation of effective financial controls xii Maintain the effectiveness of Mintek's technical assets and infrastructure xiv Continual on-the-job training and multi-skilling ix Maintain effective safety and environmental programs	• OHSAS 18001 internal audits • OHSAS 18001 external audits • ISO 14001 internal audits • ISO 14001 external audits • Legal compliance audit • NNR external audits

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				Risk Rating	Impact	Probability	Risk Rating	Impact	Probability			
			• Guideline document drawn up specifying the Control and Handling of Radioactive samples entering and leaving Mintek • Mintek employs the services of an external Radiation Specialist approved by the NNR									
16	**Physical and operational risks** GM Technology Head: Corp. SHEQ **Operational Risk**	Major spillage of hazardous solutions into drains which lead directly to river which has to be reported and cleaned up. Management response: **Mitigate**	• Procedures, training, and supervision • Environmental emergency response procedures tested and audited • Work areas where there is a risk of spillages, are situated north of Bays. All drains in this area lead to the tailings dam. Water from tailings dam gets treated in effluent plant before release to sewer • The storm water drains, situated in the road that runs directly south of the Bays, have been routed to the effluent treatment system • Public communication policy developed to deal with communication aspects involved in the case of any spillages, or gas releases, affecting the public • Overall disaster response procedure developed	64	8	8	24	8	3	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure xiv Continual on-the-job training and multi-skilling ix Maintain effective safety and environmental programs	• ISO 14001 internal audits • ISO 14001 external audits • Legal compliance audits
17	**Financial Risks** **GM: Finance** **Manager: EMS and the Head: Security** **Operational Risk**	Theft of physical assets and/or consumables. Management response: **Mitigate**	• Security on site 24/7/365 • Access control systems implemented • Regular asset and stock counts • Staff and vehicles searched • Surveillance cameras installed	54	6	9	24	4	6	**Adequate**	vii Implementation of effective financial controls. xii Maintain the effectiveness of Mintek's technical assets and infrastructure	• Internal audit • Security audits
18	**Physical and operational risks** GM Corp services Manager: EMS Manager: INF **Operational Risk**	Archives containing research records are destroyed by fire. Management response: **Mitigate**	• New Pyroshield fire extinguishing systems has been installed and is in operation. System is serviced every three months by external company • Archived material scanned into electronic format. If a fire destroys the hard copies, the electronic versions of the documents will still be available. This also allows for backups	40	8	5	24	8	3	**Adequate**	xi Protect and maintain returns from Mintek's Intellectual Property (IP) xii Maintain the effectiveness of Mintek's technical assets and infrastructure	• OHSAS 18001 internal audits • OHSAS 18001 external audits • ISO 9001 internal audits • ISO 9001 external audits • GMR(2) inspections • Workplace inspections • Legal compliance audits
19	**Financial Risks** GM: Finance Manager: FIN **Fraud Risk**	Lack of sufficient controls on identification on goods received/prevent employee collusion with preferred suppliers. Management response: **Mitigate**	• Reviewed and updated Procurement Policy and Standard Operating procedure	36	6	6	24	6	4	**Adequate**	vii Implementation of effective financial controls	• Internal Audit
20	**Business Risks** Executive Management GM: Business	Inadequate marketing results in missed business opportunities.	• Annual Marketing Plan • GM's to ensure that the individual divisions have adequate marketing plans in view of the fact that they have direct responsibility.	24	4	6	24	4	6	**Adequate**	iv Identify, and respond to, the needs of Mintek's clients (public and private) with innovative	• Internal audit

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	Development **Strategic Risk**	Management response: **Mitigate**									technologies, services, and products i Broaden Mintek's local and international marketing footprints	
21	**Business Risks** Executive Management GM: R&D **Strategic Risk**	Lack of integrated business model for rural and marginalised communities. Management response: **Mitigate**	• SSMB business model was developed	24	4	6	24	4	6	**Adequate**	v Create business opportunities for SMMEs	• Internal audit
22	**Financial Risks** GM: Finance Manager: FIN **Operational Risk**	Loss of Credit Rating with suppliers Management response: **Mitigate**	• Ensure that payment of all creditors are within stipulated timeframes • Regular review of creditor age analysis • Review all terms and conditions with approved suppliers - Letters sent to all suppliers stipulating Mintek requirements i.t.o. payments • Supplier evaluations • Regular review of procurement policy	24	4	6	24	4	6	**Adequate**	vii Implementation of effective financial controls	• Internal audit
23	**Physical and operational risks** GM Finance Head: ITS **Operational Risk**	Loss of business critical electronic data. Management response: **Mitigate**	• Storage Area Network (SAN) in place with RAID configuration (disk redundancy) • Backup process in place. Daily incremental backups and weekly full tape backups done. Backup tapes stored off-site • Critical servers can be restored from two different sources (backup tapes and Platespin Forge) • The DRP implemented by ITS caters for business continuity of critical IT services • In-house IT skills developed, e.g. SAP basis and Exchange • SLA in place with SAP consulting company to ensure availability of required SAP basis and functional skills • Skills transfer with retention clause, succession planning • Off-site storage paper records and original contracts - Metrofile system implemented	56	8	7	21	7	**3**	**Adequate**	viii Maintain the integrity of IT and financial systems xiv Continual on-the-job training and multi-skilling	• IT Steering Committee reviews • Internal audit • ISO 9001 internal audits • ISO 9001 external audits
24	**Financial Risks** GM: Finance Manager: FIN **Strategic Risk**	Impact of foreign currency fluctuations on procurement and sales Management response: **Avoid / Mitigate**	• Proposals quoted in Rands whenever possible. • If managers do business in a foreign currency, they must contact the Manager: Finance for the best exchange rate at that specific stage. This forms part of the pricing policy • Maintain an awareness of currency fluctuations in Mintek's exposure to particular currencies.	35	7	5	21	7	3	**Adequate**	vii Implementation of effective financial controls	• Internal Audit
25	**Business Risks** Executive Management CEO **Strategic Risk**	Government priorities and policy changes. Management response: **Mitigate**	• Continuous monitoring • Increased visibility of Mintek at National Treasury and DMR specifically focusing on funding issues • Continuous monitoring of departmental strategic plans and other notifications	21	7	3	21	7	3	**Adequate**	iv Identify, and respond to, the needs of Mintek's clients (public and private) with innovative technologies, services, and products	• Senior management

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			• Participation in departmental task teams and strategy sessions to remain abreast of policy changes and emerging priorities									
26	**Human resource risk** GM Technology GM Corp Services Manager: HRD Managers: SBU Head: Corporate SHEQ Head: Security **Operational Risk**	Fatality caused by Mintek operations or plant. Management response: **Mitigate**	• Controlled access to hazardous areas, work permits issued, no-entry signs • Engineering controls on plant • Induction and training of employees, job observations done to ensure that training was adequate. Records of induction, training and job observations kept • Induction of contractors. Induction records signed and filed • Mintek ensures that contractors provide a Letter of Good Standing from the Compensation Commissioner. This ensures that labour broker and contractor personnel can claim workman compensation via the companies officially employing them • Visitors must sign an indemnity form, and is given a safety pamphlet to read. In addition to this, area supervisors must make visitors aware of risks involved in the areas they visit. Visitors must be accompanied by a Mintek contact person at all times while inside a hazardous area • In cases where a third party claim (civil case) is made by someone injured at Mintek, Management has ensured that Mintek is adequately insured • Incorporated limited liability clauses in Mintek's "General Conditions of Contract" and "Conditions of Service" (for claims by people that are not employed by Mintek who are seriously injured, or from his/her family in the event of a fatality) • Indemnity certificates signed and filed	**80**	10	**8**	20	10	2	**Adequate**	xiv Continual on-the-job training and multi-skilling ix Maintain effective safety and environmental programs	• OHSAS 18001 internal audits • OHSAS 18001 external audits • Legal compliance audit • GMR(2) inspections • Workplace inspections • Internal audit
27	**Physical and operational risks** GM Finance Manager: EMS Head: Corp. SHEQ **Operational Risk**	Gas (flammable and inflammable) storage and reticulation causes' explosion which destroys surrounding buildings and causes fatalities. Management response: **Mitigate**	• LPG tank is protected by water sprays and shut off valves, which are checked and maintained by gas supplier on a yearly basis. EMS checks these on a monthly basis. • Leak detection in the tunnels conducted weekly by EMS • A professional consultant has done an MHI and fault tree analysis. He has determined that the installation complies with MHI requirements • Gas supplier did a risk assessment and Mintek is complying with all their requirements. • Monthly safety inspections are done and recorded by EMS maintenance and gas supplier does two yearly inspections • The emergency response and evacuation procedures officially tested three times per year, and the site evacuation once per year • Site evacuation alarm installed • Overall disaster response procedure developed	50	10	5	20	10	2	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure xiv Continual on-the-job training and multi-skilling ix Maintain effective safety and environmental programs	• OHSAS 18001 internal audits • OHSAS 18001 external audits • Legal compliance audits • GMR(2) inspections • Workplace inspections
28	**Physical and operational risks** GM Technology Manager: PDD **Operational Risk**	Major explosion in bay 1 or 2 results in Mintek's license to operate scheduled processes to be suspended Public may be able to object to operations of certain processes on premises on re	• Hazop studies conducted on PDD operations to identify high-risk operations and plant/process weaknesses, which are then addressed • A possible cause of explosions could be water leaks into a furnace. Various interlocks (fatal alarms, etc.) installed to monitor water flows, temperature, etc. • Procedures written for all equipment and tasks addressing identified hazards. These procedures are reviewed for each project and where necessary modified to accommodate	50	10	5	20	10	2	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure xiv Continual on-the-job training and multi-skilling ix Maintain effective safety and environmental programs	• OHSAS 18001 internal audits • OHSAS 18001 external audits • GMR(2) inspections • Workplace inspections

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		application for license. Management response: **Mitigate**	the project specific risks • Training and retraining and close supervision of operating staff is done • Combustible gases that have not combusted could result in explosions. To safeguard against this occurrence the gases are combusted in a controlled safe manner as close to the source as possible • Phasing out of Khrone switches in sub stations. EMS determined that the current switches are still legal, but they will be replaced with vacuum breakers as circumstances allow									
			• Electrical protection/tripping systems have been implemented in SUB 1 • Protection networks have been installed on Bay 2 contactors to protect feed transformers to the DC drives • All oil breakers are being serviced and checked (Oil tests to be conducted annually) • Infrared assessments of High Tension switchgear performed on a yearly basis by external company									•
29	**Physical and operational risks** GM Corporate Services and R&D Head: Corp. SHEQ **Operational Risk**	Public exposed to contaminated biological matter. Management response: **Mitigate**	• Mintek makes use of an approved medical waste disposing company • Spillages of medical waste by the medical waste disposing company, e.g. in the case of a vehicle accident, is cleaned up by trained personnel from that company	50	10	5	20	10	2	**Adequate**	xiv Continual on-the-job training and multi-skilling ix Maintain effective safety and environmental programs	• ISO 14001 internal audits • ISO 14001 external audits • OHSAS 18001 internal audits • OHSAS 18001 external audits • Legal compliance audit • GMR(2) inspections • Workplace inspections
30	**Financial Risks** GM: Finance Manager: FIN **Strategic Risk**	Extent of Mintek's liquidity ratio. Management response: **Mitigate**	• Increased effort to collect outstanding debt • Cash flow planning to increase investment returns • Control over expenditure	30	5	6	20	4	5	**Adequate**	vii Implementation of effective financial controls	• Internal audit
31	**Financial Risks** Manager: EMS and the Head: Security **Fraud Risk**	Poor key control resulting in unauthorized access or theft. Management response: **Mitigate**	• Use of specialized key safes where practical • Use of biometric access where practical	20	4	5	20	4	5	**Adequate**	vii Implementation of effective financial controls	• Internal audit • Security audits
32	**Business Risks** **Executive Management** **Management: Support Divisions** **Managers SBU** **Head: SHEQ**	Non-compliance to the applicable legislation, e.g. • Labour Act • Environmental Act • OHS Act • PFMA	• Database for Occupational Health & Safety, as well as Environmental, legislation, is available to Mintek staff. Database kept updated with new or changed legislation – updates communicated to SHEQ Department. Applicable new and updated legislation communicated to relevant Divisions for implementation • Mintek is subscribed to Sabinet Netlaw and it gets updated when legislation is updated • Keep abreast of changes to the relevant legislation through training	60	6	10	18	6	3	**In Progress**	vii Implementation of effective financial controls ix Maintain effective safety and environmental programs	• ISO 14001 internal audits • ISO 14001 external audits • OHSAS 18001 internal audits • OHSAS 18001 external audits

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				Risk Rating	Impact	Probability	Risk Rating	Impact	Probability			
	Strategic Risk	• Mintek Act • Companies Act • Tax Act Management response: Mitigate	• Employment of skilled personnel • Legislation compliance software system implemented									• Legal compliance audit • Internal audit • Compliance checklists (FIN)
33	**Physical and operational risks** GM Technology Head: Corp. SHEQ **Strategic Risk**	Loss of quality, environment or safety certification affects client's decision to use Mintek's services. Management response: **Mitigate**	• Integrated Safety, Health, Environment and Quality (SHEQ) Management System implemented • SHEQ management system audited internally and externally against ISO 9001, ISO 14001, ISO 17025 and OHSAS 18001 requirements • Regular internal audits and checking of system compliance. Audit reports submitted to Divisional Management • Legal compliance audits done by third party to ensure Mintek's compliance to all legislation that impact on Mintek's operations • Regular management reviews by SHEQ Committee to monitor, review and modify policies and procedures	56	8	7	18	6	3	**Adequate**	iv Identify, and respond to, the needs of Mintek's clients (public and private) with innovative technologies, services, and products iii Improving quality of service and response time xiv Continual on-the-job training and multi-skilling xii Maintain the effectiveness of Mintek's technical assets and infrastructure ix Maintain effective safety and environmental programs	• ISO 9001 internal audits • ISO 9001 external audits • ISO 14001 internal audits • ISO 14001 external audits • ISO 17025 internal audits • ISO 17025 external audits • OHSAS 18001 internal audits • OHSAS 18001 external audits • Legal compliance audits • GMR(2) inspections • Workplace inspections
34	**Financial and business risk** GM: Finance **Head: ITS**	Inadequate change control leading to loss or destabilization of business or technical systems.	• Clear identification of milestones and the monitoring thereof by the project manager • Change control process in place	30	6	5	18	6	3	**Adequate**	vii Implementation of effective financial controls viii Maintain the integrity of IT and financial systems	• Project steering committee
35	**Physical and operational risks** **GM: Finance** **Manager: EMS** **Operational Risk**	Danger to employees on Mintek site arising from criminal activity. Management response: **Mitigate**	• Camera surveillance to cover major vulnerable areas • Improve camera monitoring, security reaction times and procedures • Adequate security presence in high risk areas • Improve enforcement of access control • Increase general staff and security staff awareness of risk • Implement access control of parking area	24	6	4	18	6	3	**Adequate**	ix Maintain effective safety and environmental programs	• Campus inspections • Compliance with security audits • Security committee
36	**Business Risks** GM: Corporate Services Manager: HRD **Operational Risk**	Industrial action Management response: **Mitigate**	• Keep abreast of developments • Reviewed strike management policy and procedure • Reviewed security procedure for industrial action • Defined roles in dealing with media, police and public • Developed communication strategy	24	6	4	18	6	3	**Adequate**	xiv Continual on-the-job training and multi-skilling	• HR Committee • Internal audit
37	**Business Risks** GM: Corporate Services Manager: INF **Operational Risk**	Records of key external and internal documents cannot be found.	• Procedures developed to ensure good record keeping practices	24	4	6	16	4	4	**Adequate**	viii Maintain the integrity of IT and financial systems xi Protect and maintain returns from Mintek's Intellectual Property (IP)	• Internal audit • ISO 9001 internal audits • ISO 9001 external audits • ISO 14001 internal audits

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#	Risk classification Risk owner Risk Category	Description of Risk	Risk reduction measures	Before			After			Present status of risk reduction measures	Targeted Activity (The Roman numerals refer to the Targeted Activities associated with Mintek's Strategic Objectives, as listed in the beginning of this document)	Control assurance
				Risk Rating	Impact	Probability	Risk Rating	Impact	Probability			
		Management response: **Mitigate**										• ISO 14001 external audits • OHSAS 18001 internal audits • OHSAS 18001 external audits • Legal compliance audits • GMR(2) inspections • Workplace inspections • IT Steering Committee reviews • SAP project steering committee • Security audits • HIV/AIDS committee reviews
38	**Physical and operational risks** GM Finance Manager: EMS **Operational Risk**	Diesel tank leaks underground causing environmental incident which has to be reported. Clean up and repair would be needed. Management response: **Mitigate**	• Monthly check on stock levels indicates whether there are leaks	20	4	5	16	4	4	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure ix Maintain effective safety and environmental programs	• ISO 14001 internal audits • ISO 14001 external audits • Legal compliance audits
39	**Physical and operational risk** GM Technology Managers SBU **Operational Risk**	Passenger and goods liability when transporting goods and hazardous substances on public transport roads and public carriers. Management response: **Mitigate / Transfer**	• Mintek only makes use of accredited Hazardous Substance Transport companies to transport hazardous material • Mintek has the required insurance cover in cases where Mintek is held jointly liable with client • Vehicles must have the required signage • Drivers to have required permits	64	8	8	15	5	3	**In progress**	ix Maintain effective safety and environmental programs	• ISO 14001 internal audits • ISO 14001 external audits • Legal compliance audits Internal audit
40	**Management risks** Risk Management Officer **Strategic Risk**	Inadequate risk management Management response: **Mitigate**	• Developed and implemented a risk management framework • Risks identified, categorized, impacts assessed and mitigation strategies thereof determined • Risks reviewed quarterly	49	7	7	15	5	**3**	**Adequate**	vii Implementation of effective financial controls	• Internal audit • ISO 9001 internal audits • ISO 9001 external audits • ISO 14001 internal audits • ISO 14001 external audits • OHSAS 18001 internal audits • OHSAS 18001 external audits
41	**Business Risks**	Non-achievement of BEE	• Understand the legislative requirements of the Broad-Based Socio-Economic Empowerment	40	8	5	15	5	3	**Adequate**	vii Implementation of effective	• Internal audit

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				Risk Rating	Impact	Probability	Risk Rating	Impact	Probability			
	Executive Management GM: Finance GM Corp services Manager: FIN Managers SBU **Strategic Risk**	accreditation. Management response: **Mitigate**	Charter for the South African Mining Industry • Developed and implemented a BBSEE strategy • Reviewed, modified and implemented procurement policy to align to BBBEEE scorecard to achieve accreditation • Undertook a supplier audit to verify Broad-Based Black Economic Empowerment accreditation with focus on the preferred supplier list • Investigate new suppliers to achieve goal • Ensure that Mintek attains its employment equity and skills development targets								financial controls xiii Improve Mintek's succession and internal transformation processes	
42	**Physical and Operational risk** Manager: MESU **Strategy Risk**	Excessive CO_2 emissions (carbon footprint), arising from high electricity usage, result in application of financial penalties. Management response: **Mitigate**	• Evaluate and update Mintek's carbon footprint annually • Ensure that electricity is being used as effectively as possible • Demonstrate that Mintek's R&D, which is resulting in the direct electricity usage, focuses on technologies to reduce industry's electricity consumption, and that the net effect will be beneficial to the SA economy	28	4	7	15	3	5	**Adequate**	ix Maintain effective safety and environmental programs vii Implementation of effective financial controls	• ISO 9001 internal audits • ISO 9001 external audits • ISO 14001 internal audits • ISO 14001 external audits • OHSAS 18001 internal audits • OHSAS 18001 external audits
43	**Financial Risks** Executive Management **Fraud Risk**	Lack of controls on approval of overtime. Management response: **Mitigate**	• Overtime policy implemented	24	4	6	15	3	5	**Adequate**	vii Implementation of effective financial controls	• Internal Audit
44	**Physical and operational risks** GM Finance Head: ITS **Fraud Risk**	Inadequate IT security leading to unauthorized access to electronic data. Management response: **Mitigate**	• IPS implemented (intrusion prevention solution) • No unsecured shares allowed on servers. Hidden and normal shares have been implemented for all user shares • ITS has implemented secure dial up connection. The Remote Access System (RAS) has been replaced with a Virtual Private Network (VPN) • ITS supplies cable locks for all our users who have Mintek laptops • Firewalls maintained and antivirus software kept up to date • Users to comply with security policies • A document management system implemented with strict control over access to Mintek IP • Multi-level PC security to prevent unauthorized use internally. This is based on group security membership and user profiles • Developed and implemented a password change policy	56	8	7	12	6	2	**Adequate**	viii Maintain the integrity of IT and financial systems	• IT Steering Committee reviews • Internal audit • ISO 9001 internal audits • ISO 9001 external audits
45	**Security risk** GM: Finance Manager: EMS Head: Security	Inadequate access control. Management response: **Mitigate**	• Implemented database to record and control visitor access • Electronic access control • CCTV at all gates • IT server room fitted with biometric access control • Manual access control on secondary gates, these gates are only opened at specific times, at which time it is also guarded	50	5	10	12	3	4	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure	• Internal audit • Security audits

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			• Additional lighting provided at critical areas and gates • Patrols of fence, buildings and grounds • Armed response linked to panic alert system • PSIRA rated security company used • Security audits performed by external company on annual basis									
46	**Financial Risks** GM: Finance Manager: FIN	Non-compliance to Pension & Medical aid fund Legislation. Management response: **Mitigate**	• Keep abreast of developments • Total cost to company packages aligned the benefit as a defined contribution • Capped liability for post-retirement medical aid funding by contracting liability to an external financial service provider • Liability settled for Group 1 and 2 employees	50	5	10	12	2	6	**Adequate**	vi Prudent financial management of Mintek's investments & liabilities	• Internal audit • Board of Trustees
47	**Financial and business risk** GM: Finance **Head: ITS** Manager: HRD	Lack of capacity to maintain business critical IT systems. Management response: **Mitigate**	• Employ adequately trained and qualified staff • Enter into SLA with SAP partner for maintenance • Skills transfer with retention clause • Succession planning • Opportunity to contract in skills	42	7	6	12	4	3	**Adequate**	viii Maintain the integrity of IT and financial systems xiv Continual on-the-job training and multi-skilling	• IT Steering Committee
48	**Financial Risks** Executive Management Managers:SBU **Fraud Risk**	Non-compliance to the delegation of authority, checks and balances system. Management response: **Mitigate**	• Clearly defined and communicated organisational structure • Delegation of authority document approved and communicated	25	5	5	12	4	3	**Adequate**	vii Implementation of effective financial controls	• Internal Audit
49	**Physical and operational risks** GM Technology Head: Corp SHEQ Manager: EMS	Natural disasters, e.g. hailstorms, earthquakes Management response: **Mitigate**	• The emergency response and evacuation procedures being reviewed and improved. Site evacuation procedure included • Training of staff on new emergency response and evacuation procedures • The emergency response and evacuation procedures officially tested three times per year	10	10	1	10	10	1	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure ix Maintain effective safety and environmental programs	• OHSAS 18001 internal audits • OHSAS 18001 external audits
50	**Credit/Bad debt Risks** GM: Finance Manager: FIN	Client unable to complete payment for plant, product or process. Management response: **Mitigate**	• Review debtors ageing report regularly. Seek legal advice on long outstanding debts • No services to be rendered until a credit rating has been obtained from credit bureau • Develop a policy and framework in relation to new and existing clients in relation to credit vetting, invoicing and collection • Credit guaranties on foreign customers	30	6	5	9	3	3	**Adequate**	vii Implementation of effective financial controls	• Internal audit • Mancom
51	**Physical and operational risks** GM Finance	Loss of water supply. Management response:	• Ultrasonic level detector has been installed at the water tower • A technical review of Mintek's entire water reticulation system is being undertaken, which will focus on reduction of Mintek's Rand Water Board water use as well as minimising impacts of	18	6	3	9	3	3	**Adequate**	xii Maintain the effectiveness of Mintek's technical assets and infrastructure	• ISO 9001 internal audits • ISO 9001 external audits • OHSAS 18001 internal

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				Risk Rating	Impact	Probability	Risk Rating	Impact	Probability			
	Manager: EMS **Operational Risk**	**Mitigate**	any future supply disruption									audits • OHSAS 18001 external audits • GMR(2) inspections • Workplace inspections
52	**Financial Risks** GM Finance Manager: SBU **Fraud Risk**	Internal requisition fraud - staff taking goods etc. Management response: **Mitigate**	• Automated requisition process via maintenance system • Matching of requisition to job card • Clearly formalised powers and responsibilities and delegation thereof • Reviewed and improved access control • Ensure all goods are adequately insured	24	3	8	8	2	4	**Adequate**	vii Implementation of effective financial controls	• Internal audit
53	**Financial Risks** GM: Finance GM Technology/R&D Manager: FIN Managers: SBU **Fraud Risk**	Procurement fraud - requester/ buyer /supplier collusion lack of internal controls – procurement. Management response: **Mitigate**	• Review all Internal Controls and reporting systems and procedures on a regular basis • Check and ensure compliance with procurement policy • Clearly formalise powers and responsibilities and delegation thereof	16	2	8	8	2	4	**Adequate**	vii Implementation of effective financial controls	• Internal audit
54	**Human Resource Risk** GM: Corporate Services Manager: HRD **Fraud Risk**	Fraudulent misrepresentation of qualifications results in risk of technical or professional errors, client dissatisfaction, reputation loss or safety issues. Management response: **Mitigate**	• Verification check on new employee qualifications	16	2	8	8	2	4	**Adequate**	vii Implementation of effective financial controls	• Internal audit
55	**Financial Risks** GM: Finance Manager: FIN	Accuracy of financial reporting – impact on decision making. Management response: **Mitigate**	• Regular review of financial system (SAP) and system of internal controls for integrity • Measurement against budgets. Reporting on major variances • Implemented a financial reporting framework, incorporating due dates, responsibilities, delegated authority	30	5	6	4	2	2	**Adequate**	vii Implementation of effective financial controls viii Maintain the integrity of IT and financial systems	• Internal audit • MANCOM • EXCO • Board and subcommittees
56	**Financial Risks** GM: Finance Manager: FIN	Adequacy of insurance cover Fire and theft Public liability Product recall Professional indemnity Fidelity Accident cover Management response:	• Reviewed current insurance policy for completeness and accuracy • Implement asset management system, incorporating detailed asset register	25	5	5	4	2	2	**Adequate**	vii Implementation of effective financial controls	• Internal audit

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		Mitigate										
57	**Investment Risk** Executive Management	Equity position of Mintek in other companies causes Mintek to incur financial loss. Management response: **Mitigate**	• Due diligence and regular financial reporting • Investment and disinvestments policy in place	12	4	3	4	2	2	**Adequate**	vi Prudent financial management of Mintek's investments & liabilities	• Internal audit • Mindev Board • EXCO • Mintek Board
58	**Financial Risks** GM: Finance Manager: FIN	Poor investment of surplus cash reserves at Banking institutions. Management response: **Mitigate**	• Surplus reserves to be invested as per investment policy • Compliance to investing activities by Schedule 3 PFMA companies • Accounting treatment and disclosure of such investments	10	2	5	2	1	2	**Adequate**	vi Prudent financial management of Mintek's investments & liabilities	• Internal audit

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