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South African Nuclear Energy Corporation SOC Limited

ANNUAL REPORT

2021/22

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ABBREVIATIONS AND ACRONYMS

ACS	Analytical and Calibration Services
AC&D	Access Control & Intrusion Detection
AEB	Atomic Energy Board
AEC	Atomic Energy Corporation
AET	Adult Education and Training
AFS	Audited Financial Statements
AGSA	Auditor-General of South Africa
ALARA	As Low As Reasonably Achievable
AMI	African Management Initiative
ANSTO	Australian Nuclear Science and Technology Organisation
API	Active Pharmaceutical Ingredient
ARC	Audit and Risk Committee
ARPL	Artisan Recognition of Prior Learning
ASME	American Society for Mechanical Engineers
B-BBEE	Broad-based Black Economic Empowerment
BBS	Behaviour-Based Safety
BrightnESS2	Bringing Together a Neutron Ecosystem for Sustainable Science with ESS
CAE	Compliance Assurance Enforcement Inspectorate
CAL	Calibration Laboratories
CCSR	Corporate Communication and Stakeholder Relations
CHIETA	Chemical Industries Education and Training Authority
COP26	2021 United Nations Climate Change Conference
CNO	Chief Nuclear Officer
Covid-19	2019 novel Coronavirus
CRM	Customer Relations Management
CRPM	Centre for Rapid Prototyping and Manufacturing
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
DBSA	Development Bank of South Africa
D&D Stage 1	Decontamination, Decommissioning and Waste Management of Disused Historical Nuclear Facilities
D&D Stage 2	Decontamination, Decommissioning and Waste Management of Operating Nuclear Facilities
DIRCO	Department of International Relations and Co-operation
DIIR	Disabling Injury Incidence Rate
DMRE	Department of Minerals Resources and Energy
DRP	Disaster Recovery Plan
DSI	Department of Science and Innovation
DSRS	Disused Sealed Radioactive Sources
DTI	Department of Trade and Industry
EAP	Employee Assistance Programme
EDMS	Electronic Document Management System
EE	Employment Equity
EIA	Environmental Impact Assessment
EXCO	Executive Committee
FCR	Financial Compliance and Reporting
FIDPM	Framework for Infrastructure Delivery and Procurement Management
GC	Gas Chromatography
GCEO	Group Chief Executive Officer
GCFO	Group Chief Financial Officer
GDE	Gauteng Department of Education
GMP	Good Manufacturing Practice
GTAC	Government Technical Advisory Centre
HF	Hydrogen Fluoride
HR	Human Resources
IAEA MSSP	International Atomic Energy Agency Membership Support Programme
IAEA	International Atomic Energy Agency
IDC	Industrial Development Corporation
IFRS	International Financial Reporting Standards
ICPMS	Inductively Coupled Plasma Mass Spectrometry
INIS	International Nuclear Information System
i-PCIF	interim Pre-Clinical Imaging Facility
IP	Intellectual Property
IRP	Integrated Resource Plan
ISI	International Scientific Indexing
ISO 9001	Quality Management Systems - Requirements
IT	Information Technology
IVDs	Innovation Disclosures
KM	Knowledge Management
KPI	Key Performance Indicator

LEIP	Limpopo Eco-industrial Park
LEMS	Liquid Effluent Management
LEU	Low Enriched Uranium
LLW	Low Level Waste
MAPEP	Mixed Analyte Performance Evaluation Programme
MDS	Marketing and Development Services
MeASURe	Metrological and Applied Sciences University Research
MHC	Mobile Hot Cell
MWh	Megawatt Hours
Molybdenum-99	A radioactive isotope of molybdenum
MPR	Multi-purpose Reactor
MTEF	Medium Term Expenditure Framework
Necsa	South African Nuclear Energy Corporation SOC Limited
NEHAWU	National Education, Health and Allied Workers Union
Nersa	National Energy Regulator of South Africa
NFC	Nuclear Field Cycle
NFL	Nuclear Forensics Laboratories
NFP	Nuclear Forensics Programme
NIASA	Nuclear Industry Association of South Africa
NKP	National Key Point
NLA	National Laboratory Association
NLM	Nuclear Liabilities Management
NNR	National Nuclear Regulator
NQF	National Qualifications Framework
NRF	National Research Foundation
NRWDI	National Radioactive Waste Disposal Institute
NSI	National System of Innovation
NTeMBI	Nuclear Technologies in Medicine and the Biosciences Initiative
NUCOR	Nuclear Development Corporation
NuMeRI	Nuclear Medicine Research Infrastructure
NVC	Necsa Visitor Centre
NWLM	Nuclear Waste and Liabilities Management
NWU	North-West University
OHSAS	Occupational Health and Safety Series
OSCAR	Overall System for the Calculation of Reactors
OTT	Office of Technology Transfer
PAL	Pelindaba Analytical Laboratories
PBMR	Pebble bed modular reactor
P&Cs	Projects and Consulting Services
PDO	Predetermined Objectives
PDZ	Plasma Dissociated Zircon
PET	Positron Emission Tomography
PFMA	Public Finance Management Act
PMRA	Post Retirement Medical Aid
PPE	Personal Protective Equipment
PSMA	Prostate-specific membrane antigen
PSIF	Public Safety Information Forum
PwDs	People with Disabilities
PWR	Pressurised Water Reactor
RA	Radio Analysis (Laboratories)
RFI	Request For Information
R&D	Research and Development
R&I	Research and Innovation
R&TD	Research & Technology Development
REAM	Research and Asset Management
RPTC	Radiation Protection Training Centre
RRT	Research Reactor Theory
RS	Radiation Science
SABS	South African Bureau of Standards
SAFARI-1	South African Fundamental Atomic Research Installation
SAHPRA	South African Health Products Regulatory Authority
SAIW	South African Institute of Welding
SANAS	South African National Accreditation Standard
SANS	South African National Standard
SANReN	South African National Research Network
SBAH	Steve Biko Academic Hospital
SEA	Separation Element Assembly
SHEQ	Safety, Health, Environment and Quality
SOC	State-owned Company
SOE	State-owned Entity
SR	Stakeholder Relations
SRTS	Sustainable-Return-to-Service
TIA	Technology Innovation Agency
UCOR	Uranium Enrichment Corporation
UCT	University of Cape Town
USA	United States of America
WIL	Work Integrated Learning
WITS	University of the Witwatersrand
WSRF	Waste Segregation and Repacking Facility
VMM	Visitor Management Module

GENERAL INFORMATION & CONTACT DETAILS

NECSA ORIGINS

2021

Cabinet approved the Mult-purpose Reactor (MPR) that will succeeded SAFARI-1 – September 2021.

Request for Informtion (RFI) release – 06 February 2022.

2013

Cold and hot commissioning of the facility subsequently took place and the first test runs to establish dose mapping. NTP has a 40% shareholding in Gamwave.

2012

The refurbishment and upgrading of the gamma irradiation facility at Pelindaba were successfully completed and handed over to Gamwave Gauteng (Pty) Ltd.

2011

The Necsa Visitor Centre was launched

It aims to increase public awareness on nuclear and other forms of energy. Also, encourages learners on STEM subjects.

2009

NTP acquired a 55% interest in the Gammatec NDT Supplies SOC Ltd group.

Gammatec focuses on the provision of a wide range of NDT (non-destructive testing) equipment, including Ir-192 sources supplied by NTP, and Kodak film for X-ray and gamma radiography and Ultrasonic equipment and accessories manufactured by Sonatest NDE (for which they hold exclusive distributorship rights).

2008

Nuclear Skilled Development was formed, now known as Necsa Learning Academy.

2007

Pelchem was corporatised as a wholly owned subsidiary of the South African Nuclear Energy Corporation SOC Ltd "Necsa'

2003

NTP was formally incorporated as a wholly owned subsidiary of the South African Nuclear Energy Corporation SOC Ltd "Necsa'

1999

The Nuclear Energy Act (1999) transitioned from AEC to the South African Nuclear Energy Corporation (Necsa).

Early 1990s

Commercial Era:

- Mo-99 programme.
- Commercialisation of fluorine and related products.
- Atomic Energy Corporation (AEC) established.

1989

Signing of non-proliferation agreement known as the "Pelindaba Treaty".

1985

The Uranium Enrichment Corporation (UCOR) and the Nuclear Development Corporation (NUCOR) were incorporated into AEC.

1984

Pelchem SOC Ltd was established.

A wholly owned subsidiary of Necsa SOC Ltd, and is the sole producer and supplier of fluorochemicals in the Southern Hemisphere.

1982

The Nuclear Energy Act (Act 46 of 1999) made the AEC, formerly the AEB, responsible for all nuclear matters.

Mid-1970s to early 1990s

Strategic Era:

- Nuclear weapons programme.
- PWR fuel programme.

1970

UCOR (Uranium Enrichment Corporation) was established in 1970.

1965

South African Fundamental Atomic Research Installation (SAFARI-1) Materials Testing Reactor constructed and went critical on 18 March.

Reactor research:

- Accelerator and plasma research.

1960 to mid-1970

Era of research and development:

- Uranium enrichment.

1959

Government approved the creation of a nuclear research and development mandate.

1957

An inter-governmental bilateral agreement between South Africa (SA) and the United States of America (USA) on the civilian uses of atomic energy was signed in Washington, providing for the procurement of a research reactor from the USA.

1948

South Africa's Atomic Energy Board (AEB) was established primarily to regulate and control uranium production and sales.

Name and registration number

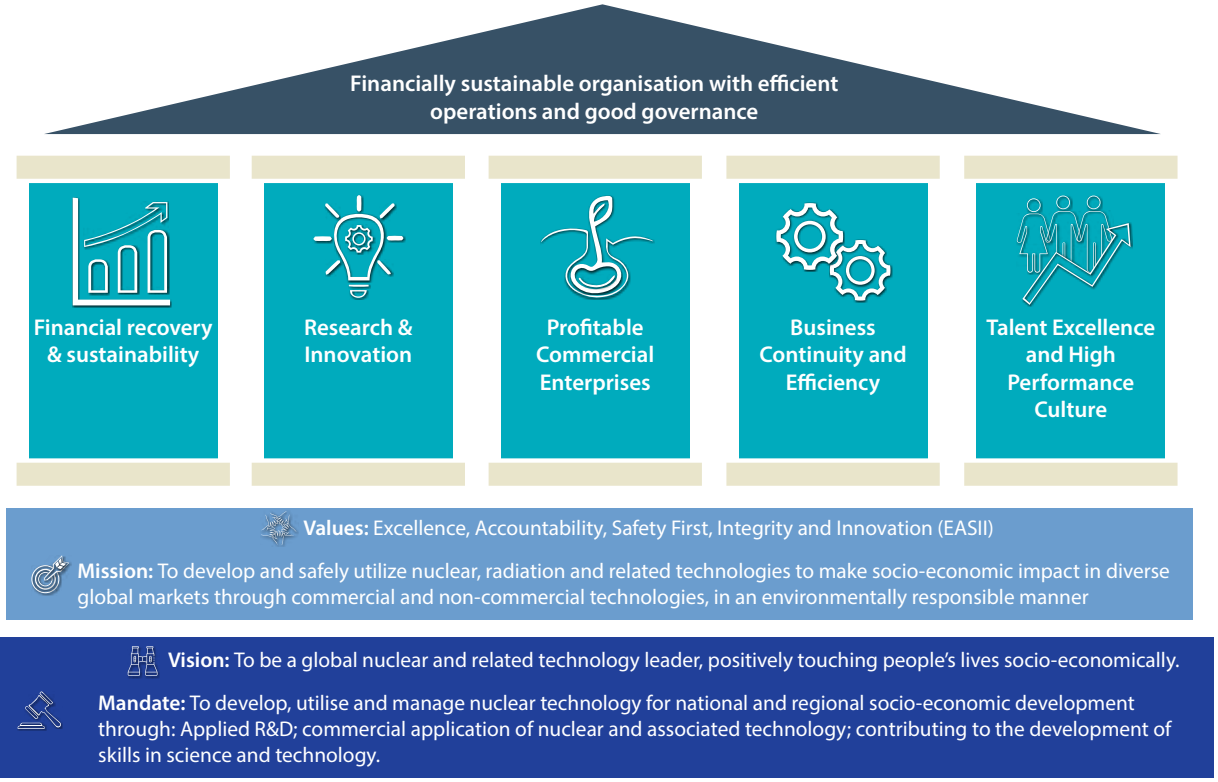
The South African Nuclear Energy Corporation, trading as Necsa, is a State-owned Company (SOC).

Registration number:	2000/003735/06
Holding Ministry:	Department of Mineral Resources and Energy (DMRE)
Country of incorporation and Domicile:	South Africa
Physical and business address:	Ellias Motsoaledi Street Extension (Formerly Church Street West) R104 Pelindaba, Brits Magisterial District, Madibeng Municipality, North West 0240
Postal address:	PO Box 582, Pretoria 0001 South Africa
Telephone number:	+27 12 305 4911
Fax number:	+27 12 305 3111
Email address:	communication@necsa.co.za
Website address:	www.necsa.co.za
External auditors:	Auditor-General of South Africa (AGSA) 300 Middel Street, New Muckleneuk Pretoria
Bankers:	Nedbank Limited, 135 Rivonia Road, Sandown, Sandton
Company Secretary:	Fakazile Nyembe +27 12 305 4454 Fakazile.Nyembe@necsa.co.za
Enquiries regarding this report:	Group Executive: Financial Capital Telephone: +27 12 305 5563 Precious.Hawadi@necsa.co.za

NECSA GROUP STRATEGY

Strategic overview

The Group strategy provides the direction to steer Necsa towards being a financially sustainable organisation with efficient operations and good governance.



Legislative Mandate

Necsa is listed as a major public entity in the Public Finance Management Act (PFMA, Act 1 of 1999, Schedule 2). The company's legislative mandate in terms of Section 13 of the Nuclear Energy Act (1999) is to:

- Undertake and promote research and development (R&D) in the field of nuclear energy and radiation sciences and technology and, subject to the Safeguards Addition Protocol, to make these generally available.
- Process source material, special nuclear material and restricted material, and to reprocess and enrich source and nuclear material.
- Cooperate with any person or institution in matters falling within these functions, subject to the approval of the Minister.

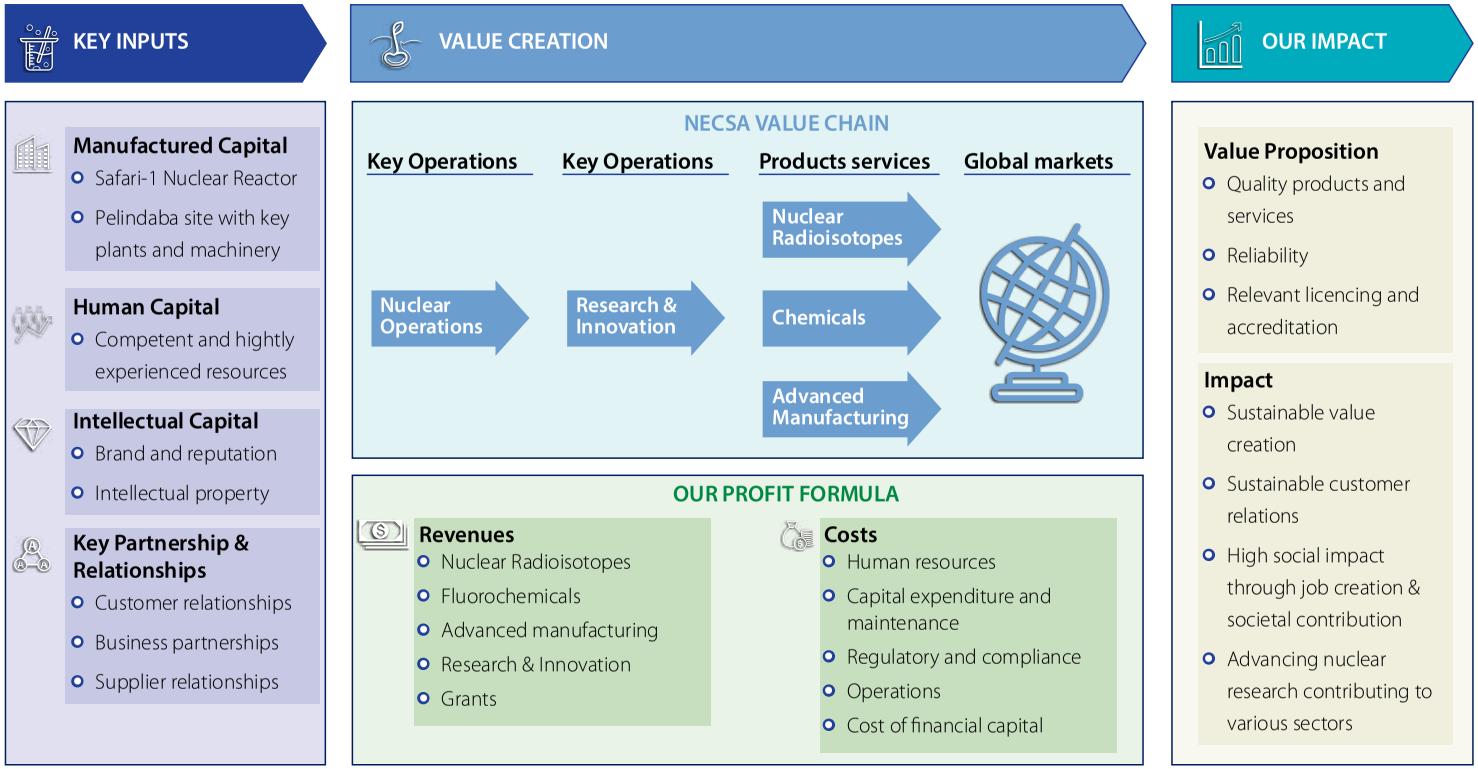
According to Section 14 of the Act, the Necsa must execute institutional responsibilities on behalf of government, which include operation and utilisation of SAFARI-1, decommissioning and waste management, and international obligations. The South African Nuclear Energy Policy of 2008 directs Necsa to:

- Investigate the entire nuclear fuel cycle with the aim of re-establishing viable fuel cycle facilities.
- Serve as the anchor for nuclear energy research, development and innovation in South Africa.

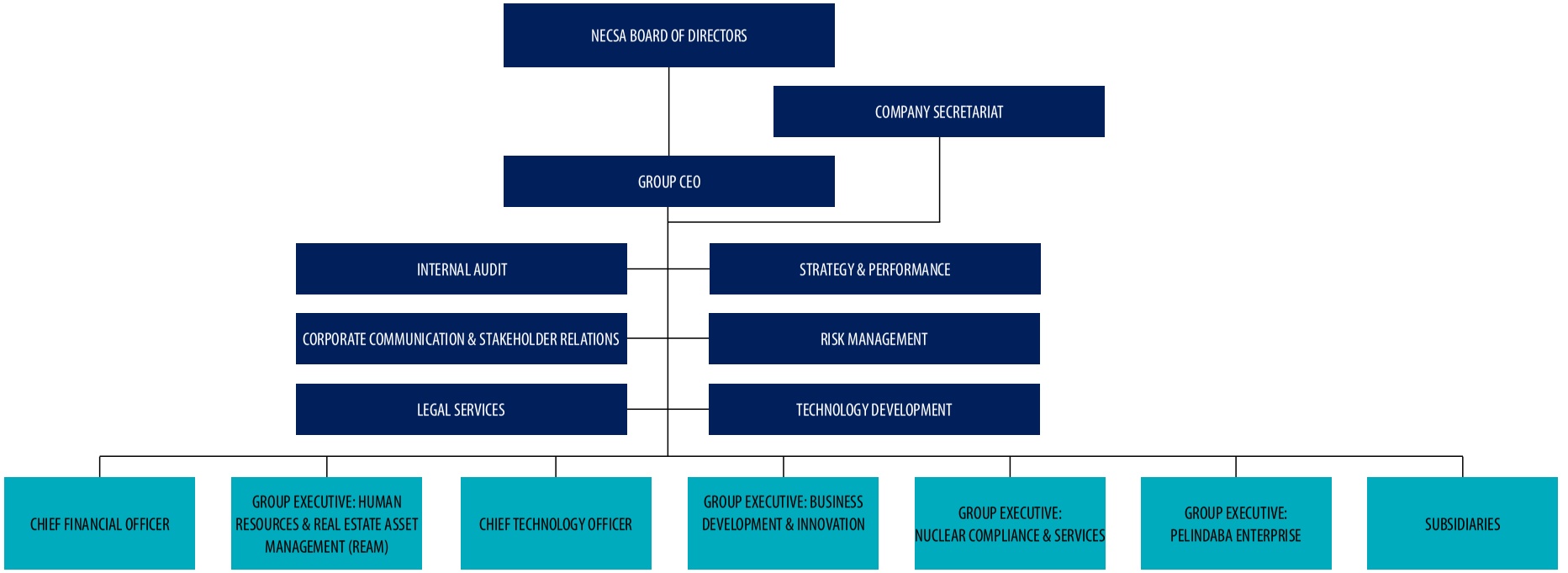
Business model

The business model shows how the Necsa creates, captures and defends value to support the mandate through three core products and services.

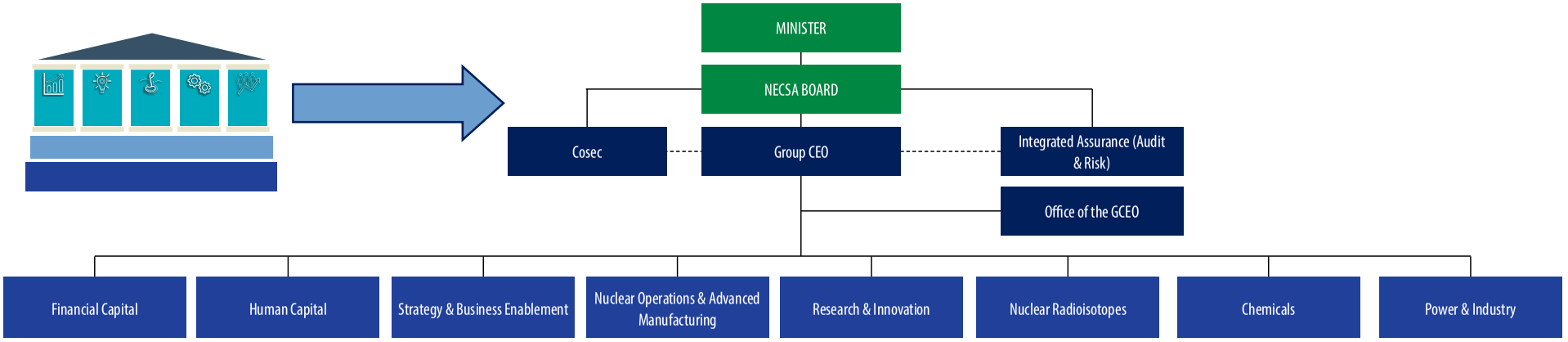
NECSA BUSINESS MODEL



ORGANISATIONAL STRUCTURE



Organisational Structure as from September 2021



2. FOREWORD OF THE CHAIRPERSON

Mr. D. Nicholls
Necsa Board Chairperson

Necsa operated under restrained socio-economic conditions for the second year under the Covid-19 pandemic. The contracted domestic and global economic climate resulted in subdued growth on the revenue front. The overall Necsa Group financial performance showed improvement compared to the previous financial year, albeit still in the loss-making position. There are positive developments that shows that the Necsa Group is getting on solid ground and anchored on a well conceptualised integrated strategy and articulated business model across the group. The Board is operating at full capacity since 2020 and oversees an entity with a fully-fledged top leadership at executive level which ensures that Necsa Group is steered in the right direction.

Strategy

The Board approved a turnaround strategy set on five pillars, namely; Financial Recovery and Sustainability; Research and Innovation; Profitable Commercial Enterprises; Business Continuity and Efficiency as well as Talent Excellence and High-Performance Culture. It should be noted that Necsa's nuclear research and development mandate remains at the core of its new strategy which added urgency of contract research growth to expand revenue. The Necsa Group upward trajectory rests on churning more innovations, increasing contracted research, claw more into nuclear advanced manufacturing domestic and global markets, amongst others.

At this time, the world sees a remarkable confluence of events laying the foundation for a sustainable renaissance in nuclear power. Government made pronouncements in recognition of nuclear power role to balance and stabilise the grid towards deriving energy security for the country. COP26 in November 2021 concluded with a call to accelerate deployment of clean power generation including nuclear while in recent months a seismic shift in perception of energy security was triggered by the Russia-Ukraine conflict.

Minister Gwede Mantashe pronounced that gas and nuclear are viable solutions during his Budget Vote on 19 May 2022. The South African government proceeded with the National Energy Regulator (NNR), and also concurring with the commencement of the process to procure new nuclear generation capacity of 2 500 MW, in preparation for new nuclear power. The NNR conducted a series of public hearings on the Thyspunt Nuclear Installation Site License application. The Deputy Minister of Mineral Resources and Energy, Dr Nobuhle Nkabane, indicated that 25 responses had been received from companies following the June 2020 Request for Information relating to the nuclear programme. Further impetus was provided by the National Infrastructure Plan 2050 which endorses the addition of 2 500 MW nuclear generating capacity as well as Necsa's Multi-purpose Research Reactor project. Necsa's Group strategy is also positioned at leveraging on nuclear new build programmes through its capacity within advanced manufacturing; training and development of artisans and nuclear science expertise within the organisation.

The Board hosted Minister Mr Gwede Mantashe and Deputy Minister Dr Nobuhle Nkabane to Necsa on 03 September 2021. The reason for this visit was to officially meet the new leadership (Board as well as

then newly appointed Group CEO) and get feedback on progress made in as far financial as recovery is concerned. During his visit, Minister Mantashe emphasised the fact that under no circumstance will government keep supporting loss-making state-owned entities. The Necsa Group leadership used this opportunity to present the progress made on Rationalisation and Restructuring that focused on a new strategy and organisational structure which was approved by the Board in August 2021. Minister Mantashe and Deputy Minister Dr Nkabane were appraised on the adopted parent company model with a lean organisational structure based on functional specialisation and divisional structures centred around specialised commercial products. The vision towards improving governance making Necsa Group financial stable and realising revenue across the group is what drives the current Board.

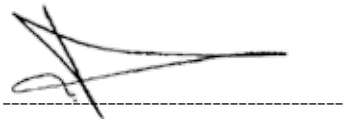
Acknowledgements

The resilience of South Africa is in large measure the result of strong independent institutions. In this vein, the Board acknowledges the keen oversight by the Parliamentary Committee on Mineral Resources and Energy, National Treasury, the National Nuclear Regulator as well as the Auditor-General of South Africa.

The support of the Department of Mineral Resources and Energy, as Necsa Group Shareholder and Executive Authority, is appreciated and in particular Minister Mantashe's steadfast support for the nuclear industry including the role of nuclear technology in resolving our country's energy situation.

The appointment of Ambassador Ndumiso Ntshinga and Mr Marthinus van Schalkwyk by Minister Mantashe in December 2021 as Necsa Board members representing the Department of International Relations and Cooperation further strengthened the Necsa Board. It was sad to lose one of our Board members, Dr Namane Magau, in the current financial year. Dr Magau is sadly missed by the Necsa Group, South Africa and the international business and academic communities at large. The Necsa Group has lost its great ambassador in Dr Magau, particularly on nuclear research and technology development and nuclear medicine. She served as the chairperson of NTP Board, later joined Necsa Group one where she chaired the Human Resources, Social and Ethics sub-committee and once more appointed on the NTP Board. Dr Magau will be remembered for her strong work ethic, integrity, fight for justice and equality for women, fairness and ethical business practice. She graciously shared her wealth of knowledge with all those that came across her path.

On behalf of the Board, I also wish to express our sincere appreciation for the tireless work and leadership of Mr Loyiso Tyabashe who finished his first full year as Group Chief Executive Officer in January 2022. The capacitation of the organisational structure is also going well with a full complement Group Exco reported by July 2022. The Board is ready to work with the executives towards a greater Necsa.



Mr. D. Nicholls

Necsa Board Chairperson

3. GROUP CEO'S OVERVIEW

Mr Loyiso Tyabashe
Necsa GCEO

It is with great pleasure and humility that I present first full-year results as Necsa Group CEO. I began this journey in the last quarter of the 2020/21 financial year taking forward my predecessor's work while also working on stabilising the company. While there was steady re-emergence of business flow as the Covid-19 restrictions were gradually lifted during the course of the year under review, the impact is still evident. The year under review was one of transition at Necsa as a new strategy and organisational structure were approved and started being implemented in the middle of it. The results will therefore show performance on the old and the new strategies respectively. We report these results against a positive background of a year where we saw the first shoots of the new strategy for growth at Necsa. Things are slowly getting back to normal and we have noted a gradual recovery in the economic front as well.

Financial Stability

The financial year began with a strong focus on setting up the company for success while monitoring financial stability and deepening governance. Success on the two items in the previous financial year (2020/21) gave impetus to the whole organisation to move forward with plans for the future. The Necsa Group's financial position is evidence that it is possible to turn our business around. The NTP subsidiary has returned to stability and we are firming up this upward revenue mobility path. We are working on a strategy to turn around our fluorochemicals subsidiary Pelchem. Necsa Corporate had made a profit of R39.7m, which was eroded by accounting entries of expected credit losses and increased D&D provisions of –R221.8m, and an increased PRMA provision of –R14.7m thus ending in a negative position of R23.199m.

Improved Governance

Another key indicator of organisational well-being is the state of its governance. There was a concerted effort during the year to improve key indicators that contribute to a well-governed organisation. The starting point was ensuring that we comply with the Board and Shareholder calendars for submission of governance documents. The discipline in this area saw the group submitting the corporate plan, shareholder compact and annual results in the time stipulated timelines as per the Public Finance Management Act (PFMA) requirements. Another important indicator for us was the results of the annual external audit by the Auditor-General of South Africa. While we are disappointed by the ultimate result of a disclaimer, we are encouraged by the improvement achieved in 2021/22, which was in order of magnitude with key issues at 14 versus 63 (2020/21) and 160 in 2019/20. The improvement is a result of hard work in the implementation of our audit recovery plan, which included an early start to audit to ensure that issues emanating from the previous years were dealt with sufficiently. We therefore move forward in our quest to entrench good governance with the confidence gained by achieving a reduction of material issues significantly in a period of one year.

Operational Improvement

Tracking the Group's overall performance on its contracted Predetermined Objectives (PDOs) provided a platform for improvement in core areas. Performance against the programmes was marginal improvement at 63% (50% for 2020/21). Focus on improving operational efficiencies is part of the new strategy. This performance was against a backdrop of balancing performing according to an existing corporate plan whilst transitioning to a new approved strategy and corporate plan.

Strategy Formulation and Implementation

The strategy formulation journey has been a fulfilling one because we made it an inclusive exercise. We share the pride of all our employees about the final product that started by company-wide consultations to find out what we needed to start doing, stop doing and do more. These exercises included visioning our future, agreeing on new values that would guide our move to a high performance culture, consultations with various levels of employees and ultimately ending with an approved strategy and organisational structure in August 2021.

Our new strategic plan comprises five strategic pillars which guided the design the new Necsa Group functional structure. These pillars are:- Financial Recovery and Sustainability, Research and Innovation, Profitable Commercial Enterprises, Business Continuity and Efficiency, Talent Management and High Performance Culture. Our corporate plan to operationalise the strategy has key performance areas attuned to the strategic pillars to ensure that we deliver to our strategic goals. We are monitoring our performance closely with a goal of improving in our operational performance in the coming year.

Part of the strategy was implementing rationalisation of the Necsa Group largely to achieve cost containment, revenue increases and improving efficiencies by leveraging synergies across the Group. While this process has been in the making at Necsa since 2017, it really got speed in 2021. A Rationalisation and Restructuring Task Team was established to capacitate the process and guide implementation of this leg of the strategy. Strong emphasis was placed on regular consultation and engagement with the Group Bargaining Forum, management, staff as well as key external stakeholders throughout the process to get the pulse of the organisation, chart the way forward on agreed activities and give updates on progress.

Capacitation of the top structure was first priority to ensure accountability for the implementation of the strategy. As a company that hosts a nuclear installation, accountability for safety is critical, which requires stable leadership. By the end of the year under review, a total of nine Group Executives including Company Secretary and Managing Directors for our subsidiaries NTP and Pelchem were appointed. Executives for Power and Industry and Integrated Assurance were appointed in the current financial year in June and July respectively. The process of placement of subsequent levels reporting to the executives is currently underway with an objective of finalising by year end. We decided to prioritise sustainability over speed in building the new organisation.

Over and above the strategy pillars, it was important to look at key projects that will set Necsa on a growth path and sustainability that will outlive our generation and careers. The MPR is one of these projects. At the core of our long-term sustainability is the replacement of the SAFARI-1 research reactor at Pelindaba, which is nearing the end of its lifespan after 57 years of operation. The approval in September 2021 by Cabinet of the Multi-purpose

nuclear reactor (MPR) project set in motion an exciting megaproject, which will secure the Necsa Group's future and set South Africa ahead above the rest in terms of isotope production. We made good progress in the year under review, releasing a Request for Information (RFI) on 06 February 2022 and engaging interested parties in March 2022. This has informed the feasibility study, which is currently underway preceding the request for proposals.

Employee Relations

Necsa Group maintains sound labour relations achieved mutual beneficiary engagements through the Bargaining Forum. There was a three-year Collective Agreement signed with unions, which contributes towards stability within the working environment. Our employees were kept abreast on organisational developments in particular on the restructuring and rationalisation process through various direct staff engagements and written communiques. Employee Wellness also played a major role in ensuring that employees are supported on the negative impacts of Covid-19.

Stakeholder Engagements

Creating and maintaining good relationships with our stakeholders is an important leg of managing our business. Our stakeholders are important for our sustainability because they are the ones who give us a licence to operate in our quest to create value for our shareholder, employees, customers, bankers, partners, regulators, local communities and society at large. We therefore extended our stakeholder engagements a bit wider in the year under review covering primarily those who are impacted by our activities and those who are key in growing our business (authorisers) and increasing revenues (customers and partners).

Acknowledgements

In conclusion, I wish to recognise the sound guidance of the Necsa Board under the leadership of the Chairperson Mr David Nicholls. The Board had played a critical role in guiding our strategic journey and ensuring that Necsa's governance framework is robust in the implementation of its business activities. The oversight work they do in the various Board sub-committees gives impetus to our operations.

We congratulate our Chairperson, Mr David Nicholls for being chosen as the South African Institute of Electrical Engineers' "Engineer of the Year" for his leadership of its Nuclear Chapter and the new Nuclear Research Centre at the University of Johannesburg.

My appreciation also goes to the Executive team, as well as the newly appointed Managing Directors of NTP and Pelchem, all of whom have rallied to the cause of Necsa Group's turning the corner.

Finally, and most heartfelt, I recognise staff who have laboured under the dual burdens of strict austerity and the unavoidable uncertainty that organisational restructuring brings. Although our burden will never be light, it is rejuvenated through internalising Necsa Group's EASII values of Excellence, Accountability, Safety First, Integrity and Innovation. We look forward to take this organisation of ours to greater heights.

Mr Loyiso Tyabashe

Group Chief Executive Officer

HIGHLIGHTS OF THE 2021/22 FINANCIAL YEAR

- Cabinet approval of the Multi-purpose Reactor (MPR) to replace SAFARI-1 in September 2021.

- Necsa Group Board approval of the new strategy and structure, on 30 August 2021.

- NTP locally produced Lutetium-177 PSMA (treatment of prostate cancer), in August 2021.

- Necsa received contract worth R16.77 Million for dismantling old PTR and installation projects during Koeberg outage.

- The Necsa Research Reactor Theory department had developed Plasma Waste gasification technology which include tyre waste, municipality solid waste, electronic waste and medical waste.

- Agreement with UltraSafe Nuclear Coperation, the Nuclear's South African affiliate to use of Necsa's OSCAR-5 calculation platform to support reactor concept design.

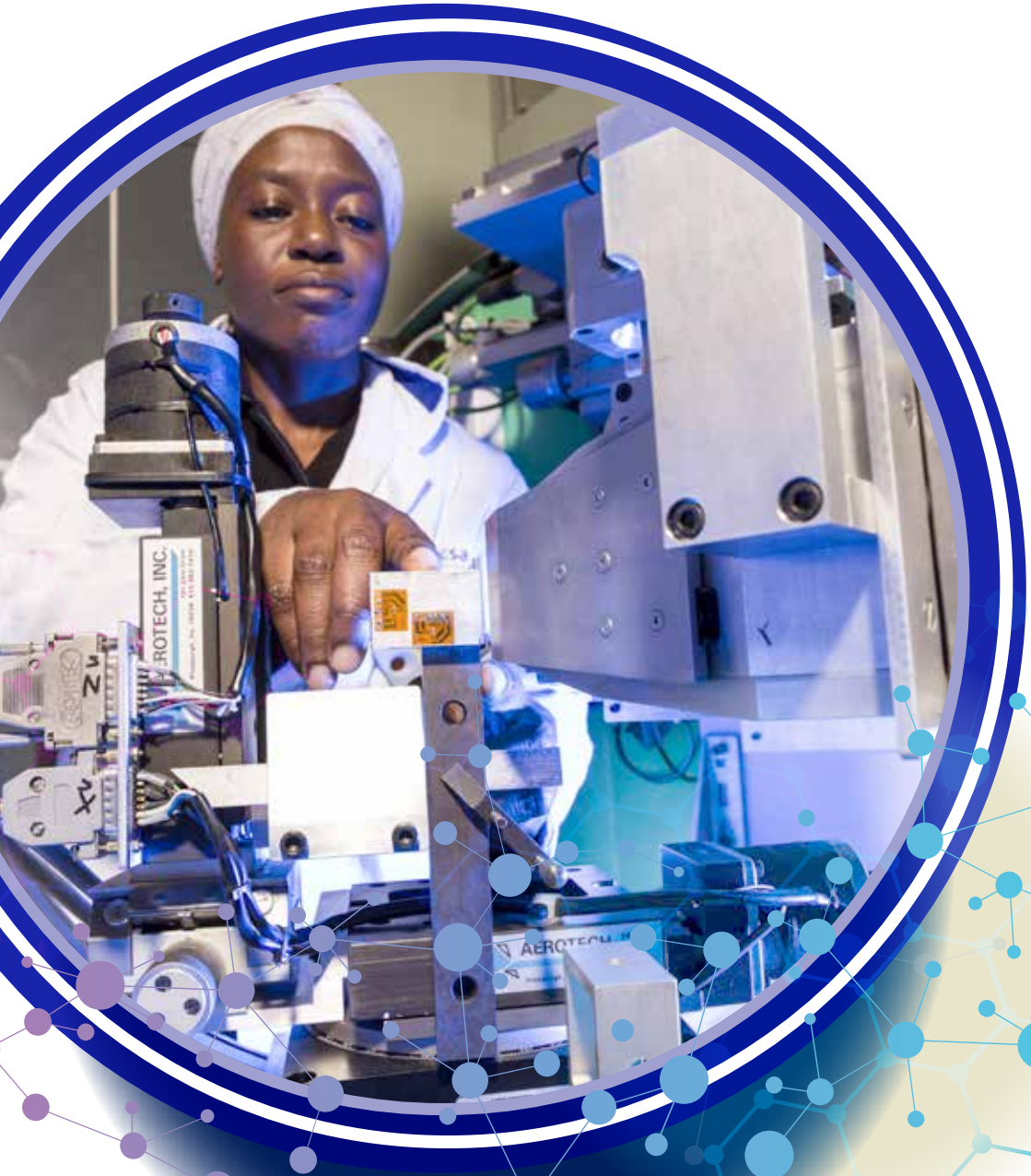
- Performance of Necsa Laboratories providing Analytical, Calibration, Nuclear Forensics and Radiation Protection Consultancy proficiency test schemes improved significantly from 77% last FY to 91%.

- Necsa Research Reactor Theory (RRT) staff supervising 7 post-graduate (3 MSc and 4 PhD) students and one intern for on job training.

- Dr. H. Bissett is currently a co-supervisor for six post-graduate students of which four are situated at Tshwane University of Technology, one at the Central University of Technology and another student at Stellenbosch University. Dr. I.J. van der Walt is currently the co-supervisor for three M.Tech students from Tshwane University of Technology, one M.Eng from North West University, one M.Eng from Wits, one M.Sc from Sefako Makgato University and one Ph.D from University of Pretoria.

- Seven (7) innovation were disclosed to the Intellectual Property Management office during the reporting year.

KEY PERFORMANCE INFORMATION



Public institutions have a responsibility to publish performance information to account to Parliament in accordance with section 92 of the Constitution and to be transparent to the public in accordance with section 195 of the same.

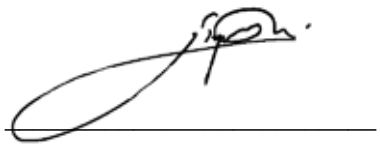
There is alignment in terms of the Necsa's strategic outcome orientated goals and performance indicators across the Shareholder's Compact with the DMRE, the Corporate Plan and Performance Reports.

5.1 STATEMENT OF RESPONSIBILITY FOR PERFORMANCE INFORMATION

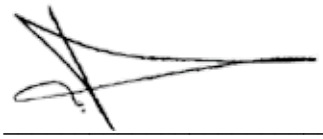
The Board, as the Accounting Authority, is responsible for implementing a system of internal controls to provide reasonable assurance in relation to the integrity of the performance information, human resources information and the annual financial statements. The Group Chief Executive Officer (Accounting Officer) is responsible for the preparation of Necsa's performance information and for its veracity. This Annual Report has been prepared in accordance with the guidelines issued by National Treasury and Annual Financial Statements (AFS) in accordance with International Financial Reporting Standards (IFRS).

The AGSA has examined the company's AFS and PDOs for the year ended 31 March 2022 and their report is presented on page 155 to 164. All information disclosed in this Annual Report is consistent with the AFS as audited by the Auditor-General.

In our opinion, the Annual Report fairly reflects the operations, performance information, human resources information and the financial affairs of the Necsa for the financial year ended 31 March 2022.



Mr L Tyabashe
Group Chief Executive Officer
Date: 31 August 2022



Mr D R Nicholls
Chairperson of the Board
Date: 31 August 2022

5.2 AUDITOR-GENERAL'S REPORT: PREDETERMINED OBJECTIVES (PDOs)

The AGSA currently performs the necessary audit procedures on the performance information to provide reasonable assurance in the form of an audit opinion. The audit opinion on the performance against PDOs is included in the management report, with material findings being reported under the Predetermined Objectives heading in this report. Refer to page 162 to 163 of this report for the Independent Auditor's Report on PDOs.

5.3 OVERVIEW OF PUBLIC ENTITY'S PERFORMANCE

Given Necsa's mandates relating to research and development and national nuclear obligations, the company is not directly involved in service delivery to the public. Salient issues from the external environment include:

Service delivery environment

Given Necsa's mandates relating to research and development and national nuclear obligations, the company is not directly involved in service delivery to the public. Salient issues from the external environment include:

- July 2021 civil unrest - SANDF deployed at Necsa as part of safeguarding critical infrastructure which was a directive from government to protect all National Key Points, (National Key Point) on 26 July 2021 till 13 September 2021.
- NERSA concurred with the commencement 2 500 MW Nuclear New Build - On 26 August 2021.
- Cabinet approval of the Multi-purpose Reactor (MPR) to replace SAFARI-1 in September 2021. A Request for Information (RFI) for the MPR was released on 6 February and closed on 8 April 2022. Two (2) supplier briefings were held aimed at affording potential domestic and international vendors platforms for clarity on pertinent information.

Organisational environment

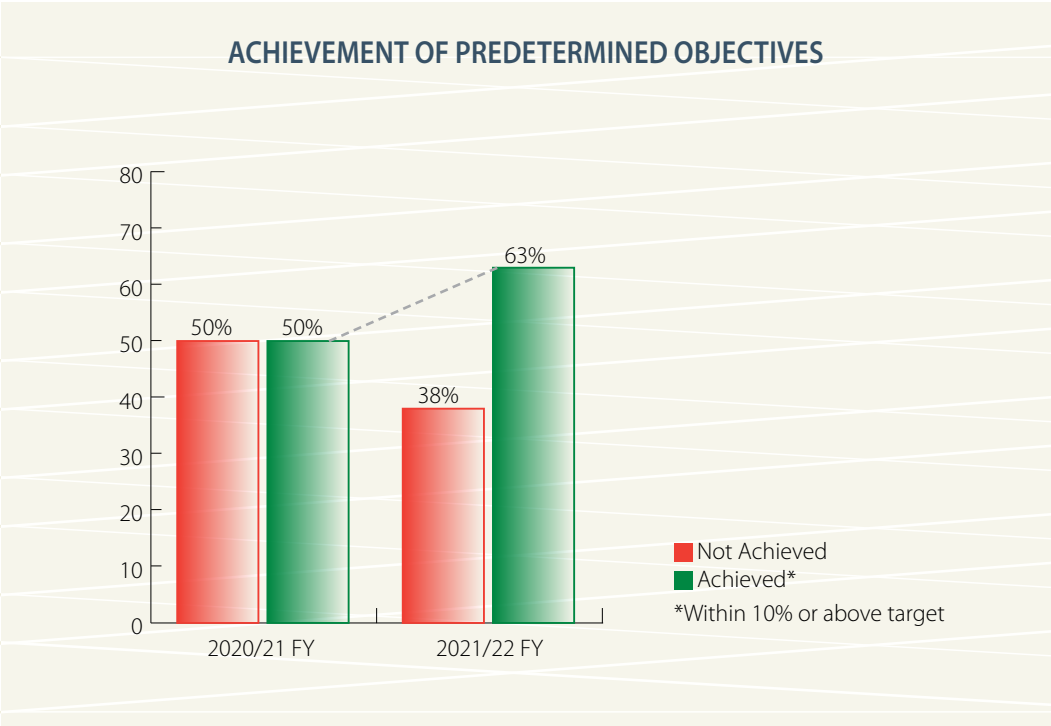
A number of internal factors are notable in relation to Necsa's performance in the past financial year:

- DMRE Minister Mr Gwede Mantashe and Deputy Minister Dr Nobuhle Nkabane visit - 03 September 2021.
- COVID-19 - By 31 March 2022, the Necsa Group had recorded 428 positive COVID-19 cases and eleven fatalities. None of the recorded Covid -19 cases were confirmed to be work related.
- The organisation remained challenged by loss of skills and aging infrastructure to be addressed in the upcoming financial years.
- Rationalisation and Restructuring Project
  - The Necsa Group Board, on 30 August 2021, approved the new strategy and structure. A parent company structure was adopted with the inclusion of the Group CFO in the parent company Board. Each subsidiary's board will be chaired by the Necsa GCEO, composing respective MDs, Group CFO, two parent company Board members and shareholder representatives.
  - Appointment of a new Executive team as well as Managing Directors for the NTP and Pelchem subsidiaries.
  - Functional structures reporting to Group Executives were finalised.

5.4 PERFORMANCE INFORMATION BY PROGRAMME

Performance against planned indicators and targets, as contracted in the Shareholder's Compact of 2021/22 between Necsa and the Minister of Mineral Resources and Energy, is presented in the prescribed tabular format below.

No significant changes were made between the revised Shareholder's Compact for 2020/21 submitted in September 2020 and the Compact submitted at the end of February 2021 for the 2021/22 financial year in respect of the Key Performance Indicators (KPIs) against set targets. However, targets set for previous structure e.g. Pelchem, Pelindaba Enterprise and Research and Development were significantly reduced compared to that indicated in the prior year's Compact for 2021/22.



Necsa's objectives are grouped into four strategic programmes, namely:

1) The Commercial Programme:

2) The Growth Initiatives Programme:

3) The Infrastructure Programme:

4) The Research Capability, Support Services and Compliance Programme.

5.4.1 COMMERCIAL PROGRAMME

The Nuclear Energy Act (1999), in sections 14(1) (a) and14 (2), provides for the Necsa's commercial mandate through exploitation of technology and utilisation of business opportunities. The Commercial Programme brings together those Necsa functions that have proven customer bases and with potential to continue operating profitably or which can be expected to grow and become profitable. The three contributors to this programme are nuclear medicine and industrial isotopes (NTP SOC Ltd), fluorochemicals (Pelchem SOC Ltd) and nuclear and industrial manufacturing.

The commercially related objectives remained the same as those set for the 2021 financial year apart from minor rephrasing in aid of clarity.

Table 1: Commercial Programme: Performance indicators, planned targets and actual achievements						
Key performance area	**Key performance indicator**	**Actual achievement 2020/21**	**Planned target 2021/2022**	**Actual achievement 2021/2022**	**Deviation from planned target 2021/2022**	**Comment on deviation**
Nuclear Medicine and Industrial Isotopes	Mo-99 market share	20%	20%	20.2%	Target exceeded by 0.2%	
	Widen the range of medical radio-isotopes	4	4	4	Target met	Four products: Mo-99, I-131, Lu-177 and F-18.
	NTP Group revenue	R917.19m	R1.24b	R1.17b	Achievement within 10% of target	Revenue lower than expected due to: • Lower global demand (COVID-19). • Unavailability of routes to Japan. • Stronger Rand. • Loss of market share by major customer.
	NTP Group net profit after tax	R32.39m	R84.53m	R 60.59m	Target missed by R23.94m	Profit not achieved due to reduced revenue and increased provisions for expected credit loss.
	SAFARI-1 Operation: Operational availability (days per year)	298.83 days	287 days	293.76 days	Target exceeded by 6.76 days	
Fluorochemicals	Pelchem revenue	R130.4m	R212.5m	R120.96m	Target missed by R91.5m	• Delayed Tube Trailer project. • Low sanitiser sales. • Lower AHF/HF sales. • Poor HF plant performance during Feb and Mar 2022.
	Net profit after tax	(R76.52m)	(R43.3m)	(R61.22m)	Target missed by R17.9m	Refer to reasons listed above on Revenue.
	Weighted average utilisation (production)	53%	>88%	64%	Target missed by 24%	• Unavailability of products to fluorinate/cylinders to fill. • Fluoroganics (FLO) plant not in operation due to lack of demand.

Table 1: Commercial Programme: Performance indicators, planned targets and actual achievements						
Key performance area	**Key performance indicator**	**Actual achievement 2020/21**	**Planned target 2021/2022**	**Actual achievement 2021/2022**	**Deviation from planned target 2021/2022**	**Comment on deviation**
	Weighted average availability (maintenance)	69%	>84%	77%	Achievement within 10% of target	Highly corrosive, aged plant which is demanding in terms of maintenance costs.
	Regulatory compliance (Licence to operate)	100% compliance	100% compliance	100% compliance	Target met	
	BBBEE level	No rating	6	Non-compliant	Target missed	Due to prior year disclaimed audit opinion.
Nuclear and Industrial Manufacturing	Pelindaba Enterprises revenue	R39.5m	R36.5m	R65.5m	Target exceeded by R29m	
	Net profit	(R14.7m)	(R10.2m)	(R35.2m)	Target missed by R25m	Overspending due to provision for bad debts and cost of sales.

5.4.2 GROWTH INITIATIVES PROGRAMME

Some of the Necsa's identified projects for long-term sustainability require strong R&I involvement to increase technology readiness towards commercially viable products and services. The impact areas concerned are: Clean Energy, Medical Diagnostics and Therapy, Industrial Applications, Materials Beneficiation, and Nuclear Waste.

The growth-related objectives remained unchanged from 2021 financial year.

Table 2: Growth Initiatives Programme: Performance indicators, planned targets and actual achievements						
Key performance area	**Key performance indicator**	**Actual achievement 2020/21**	**Planned target 2021/2022**	**Actual achievement 2021/2022**	**Deviation from planned target 2021/2022**	**Comment on deviation**
Growth Initiatives	Contract research revenue from R&I	R28.54m	R20m	R47.7m	Target exceeded by R27.7m	
	Revenue from Impact Area projects	R7.95m	R38m	R5.3m	Target missed by R32.7m	Potential investors required higher levels of technology readiness than was available.
	Research publications	33	26	36	Target exceeded by 10 publications	Note: Only peer reviewed publications are noted here.
	Innovation disclosures	8	6	7	Target exceeded by 1 innovation disclosure	

Table 2: Growth Initiatives Programme: Performance indicators, planned targets and actual achievements						
Key performance area	**Key performance indicator**	**Actual achievement 2020/21**	**Planned target 2021/2022**	**Actual achievement 2021/2022**	**Deviation from planned target 2021/2022**	**Comment on deviation**
Stage 1 D&D Programme Execution	D&D programme execution (Stage 1): Execution of Annual Plan of Action as approved by DMRE	27.01%	100%	81.08%	Target missed by 18.92%	○ Work performed on some projects beyond the scope of the Annual Plan of Action.

5.4.3 INFRASTRUCTURE PROGRAMME

The Infrastructure Programme amalgamates initiatives characterised as capital investments vital to the long-term sustainability and growth of the Necsa Group. These share the commonality that they should be regarded as megaprojects implying unusually high levels of investment, complexity and risks. The contributors to the Infrastructure Programme are the MPR, Nuclear Power and Real Estate Asset Management (REAM) Masterplan.

The infrastructure-related objectives remained unchanged from the previous financial year.

Table 3: Infrastructure Programme: Performance indicators, planned targets and actual achievements						
Key performance area	**Key performance indicator**	**Actual achievement 2020/21**	**Planned target 2021/2022**	**Actual achievement 2021/2022**	**Deviation from planned target 2021/2022**	**Comment on deviation**
Multi-Purpose Research Reactor	FIDPM (Framework for Infrastructure Delivery and Procurement Management) Stage	(Prefeasibility Study) Report approved and submitted to DMRE for Gateway Review on 27 November 2021.	○ Update Prefeasibility study with Gateway Review recommendations ○ Complete validation of financial model ○ Start feasibility study ○ Start EIA and siting justification	○ Pre-feasibility study approved and Gateway Review closed ○ Validation of financial model complete ○ Feasibility study in progress ○ EIA in progress ○ Siting licensing strategy draft completed ○ ISA stage 3 submission ○ BFI application approved by NT ○ RFI closing date was 8 April 2022 published.	Target met	

Table 3: Infrastructure Programme: Performance indicators, planned targets and actual achievements						
Key performance area	**Key performance indicator**	**Actual achievement 2020/21**	**Planned target 2021/2022**	**Actual achievement 2021/2022**	**Deviation from planned target 2021/2022**	**Comment on deviation**
Pelindaba Masterplan	Support future infrastructure plans as well as commercialise for income generation	None	○ Pre-feasibility studies for the following districts: ○ The Nuclear Medical Tourism District ○ The Solar Farm ○ The River Park (social housing for the Necsa Group's employees mainly)	Funds not yet secured	Target missed	Necsa was not able to fund the project.

5.4.4 RESEARCH CAPABILITY, SUPPORT SERVICES AND COMPLIANCE PROGRAMME

The Research Capability, Support Services and Compliance Programme consolidates functions related to the support of operations and compliance with regulatory requirements. Due to the highly technical nature of the Necsa's activities, specialised technical support and maintenance are vital. In addition, a heavy burden of compliance has to be shouldered as a result of the Group's status as a SOC, as well as nuclear license holder. The contributors to this programme are:

1) Research and Innovation
2) Maintenance, Utilities and Engineering
3) Safety, Security, Health, Environmental Protection, Nuclear Licensing and Quality Management
4) Nuclear Safeguards
5) Analytical and Calibration Services
6) Human Resources
7) Finance and Information Technology.

While the programme contributors and objectives remained essentially unchanged from the previous financial year, the programme name was changed from ***"Support Services and Compliance Programme"*** to ***"Research Capability, Support Services and Compliance Programme"*** to better reflect its constituent parts.

The unit for measuring the public dose (radiation) impact PDO was changed from ***"% of National Nuclear Regulator (NNR) allowable limit"*** to a target value expressed directly in millisievert, the unit of radiation dose.

Table 4: Research Capability, Support Services and Compliance Programme: Performance indicators, planned targets and actual achievements						
Key performance area	**Key performance indicator**	**Actual achievement 2020/21**	**Planned target 2021/2022**	**Actual achievement 2021/2022**	**Deviation from planned target 2021/2022**	**Comment on deviation**
Compliance to SHEQ, license and other regulatory requirements	Disabling Injury Incidence Rate (DIIR)	0.27	<1.8	0.67	Target exceeded	Note: Reported over rolling preceding 12-month period.
	Public dose impact limit	0.003641 mSV	<0.25 mSV	0.004276 mSV	Target exceeded	Note: Reported on calendar quarter basis, i.e. Jan-Dec 2021.
Human Resources Management	Number of successors available for each critical position	Not available	A minimum of one successor for each core technical position	Classification of all positions completed	Target met	Note: Information is reflective of the old Necsa structure and Corporate Plan.
	Percentage increase of Black females in middle management positions and higher	1.25%	10%	9.1%	Achievement within 10% of target	Four Exco black females were appointed but due to rationalisation process, no other appointments were made.

Performance measurement facilitates accountability on governance to stakeholders, parliament and members of the public and also track Necsa's progress on approved deliverables.

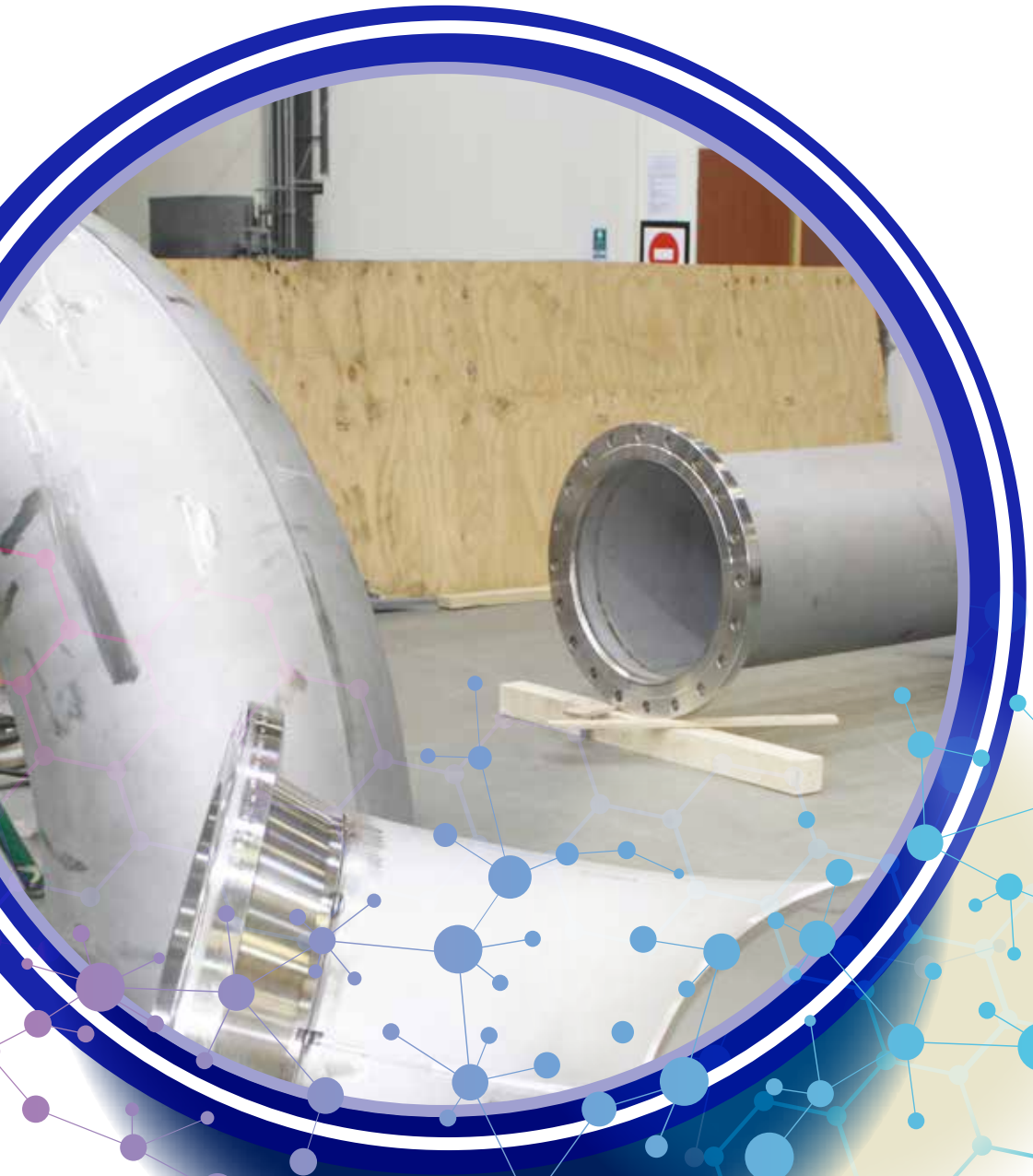
Pelindaba

5.5 STRATEGIC OUTCOME-ORIENTATED GOALS

STRATEGIC OBJECTIVES AND KPAs

	STRATEGIC PILLARS	DESCRIPTION OF STRATEGIC OBJECTIVES	KPAs
1	Financial Recovery & Sustainability	Resolve short-term cash flow challenges while achieving medium to longer-term growth, profitability and sustainability for the Group.	1. Financial Growth 2. Audit Outcome
2	Research & Innovation	Deliver new technologies that will enable growth in existing areas while creating new technologies that lead to future commercial enterprises.	1. Increased Revenue 2. Research Publications 3. Innovation Disclosures
3	Profitable Commercial Enterprises	Demonstrate sound understanding of the markets and make strategic choices and that will succeed at implementing chosen growth and profitability strategies.	1. NTP NPAT 2. Pelchem NPAT
4	Business Continuity & Efficiency	Integrated Management System (IMS) with excellence, effectiveness and efficiency of operations as central pillars, a strong safety culture with good adherence to the SHEQ system, strong conformance to all nuclear facility licensing conditions, a well-entrenched Governance System, and good strategic support for core commercial areas.	1. Operational Safety 2. Operational Compliance 3. SAFARI Availability 4. MPR 5. D&D Programme Execution
5	Talent Excellence and High Performance Culture	A strong organisational culture with a fully entrenched set of organisational values, best skilled and experienced resources deployed throughout the organisation with a strong performance system and continuous improvement well entrenched. All staff will be continuously trained and developed.	1. Performance Management 2. Talent Management 3. Transformation

NECSA DIVISIONS AND KEY SUBSIDIARIES



6.1 GROUP FUNCTIONS

6.1.1 COMPANY SECRETARY

Functions performed by the Necsa Group Company Secretariat include preparing the annual Board schedule of meetings, timeous distribution of correspondence, record keeping, preparing resolutions for meetings preparing Board and Board subcommittee minutes and resolutions. The returns required by the Companies Act (Act 71 of 2008) were completed and lodged on time. The function is currently performed by the Necsa Company Secretariat.

6.1.2 LEGAL SERVICES

The Necsa Legal Services Department is responsible for rendering legal advisory services with respect to contracting and statutory compliance issues while liaising with external parties as required. In addition, the Department manages the Necsa's litigation matters and submits quarterly litigation reports.

6.1.3 INTERNAL AUDIT

As part of the Necsa's internal control function, Internal Audit evaluates the effectiveness of the Necsa Group's risk management process and internal control systems, including financial internal controls, governance and ethics-related processes. Assurance and consulting services regarding these matters are provided to the Board Audit and Risk Committee.

The key activities of Internal Audit include the continuous evaluation of risks associated with the integrity of financial and operational information, resource utilisation, asset management as well as compliance with legal requirements. In addition, consultation services are provided to the Necsa Group for improving performance and applying corporate governance best practices.

Planned and ***ad hoc*** audit projects are carried out in accordance with both an Annual Plan and a three-year rolling plan approved by the Audit and Risk Committees. A risk-based approach to audit projects is followed and the following audit focus areas are included with the results reported to the Audit and Risk Committees on a quarterly basis:

- Systems and Compliance Audit
- Corporate Governance and Ethics-related Audit
- Risk-based Performance Audit
- PDO Audit
- Information Technology (IT) Audit
- Ad hoc Audits and Special Investigations.

6.1.4 STRATEGY AND PERFORMANCE

The Strategy and Performance Department supports the Necsa Group in the following matters:

- Corporate Planning
- Performance Monitoring and Reporting
- Competency for Quality Management
- Advisory function in Project Management
- Ad hoc matters assigned by EXCO.

The Strategy and Performance Department contributes to the group strategy as developed by EXCO and ***ad ho***c task teams. Planning for Strategic Focus Areas is combined with a range of subsidiary plans as well as the Shareholder's Compact into the group Corporate Plan submitted for approval by the Executive Authority at the end of February.

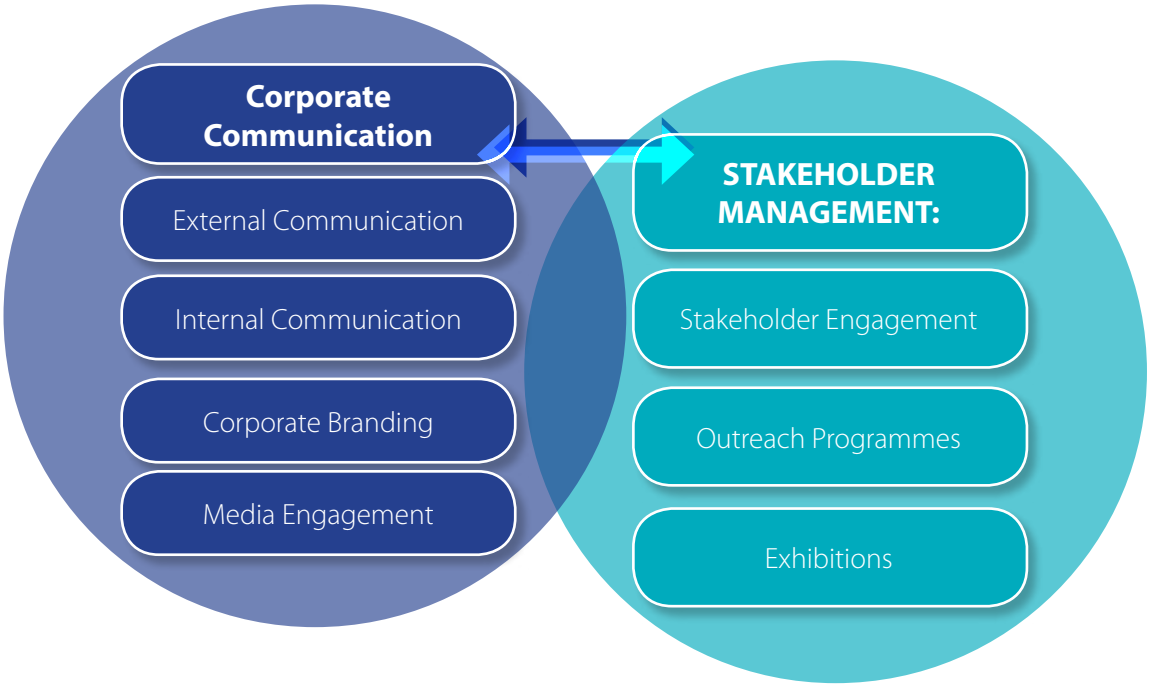
Performance is evaluated against the PDOs documented in the Shareholder's Compact. Quarterly reports which are due for submission one month after the end of each quarter – contain quarterly progress against the PDOs and are submitted to both the DMRE as well as National Treasury. Quarterly reports also include narrative on each of the Strategic Focus Areas as well as all other reporting items agreed with the Shareholder. Following the end of a financial year, an Annual Performance Report is produced for inclusion in the Necsa Group Integrated Annual Report. This details final performance for the financial year against the PDOs, as reflected under "Performance information by programme" on page 18-25.

In accordance with its Performance Information Management Policy, the Strategy and Performance Department is responsible for record keeping in relation to corporate performance. This enables timely responses to both internal and external audit queries.

Quality Management contributes to the Necsa Group's Integrated Management System and quality culture. Assistance is provided with management system improvements. Safety and security culture awareness for the Office of the GCEO is also undertaken.

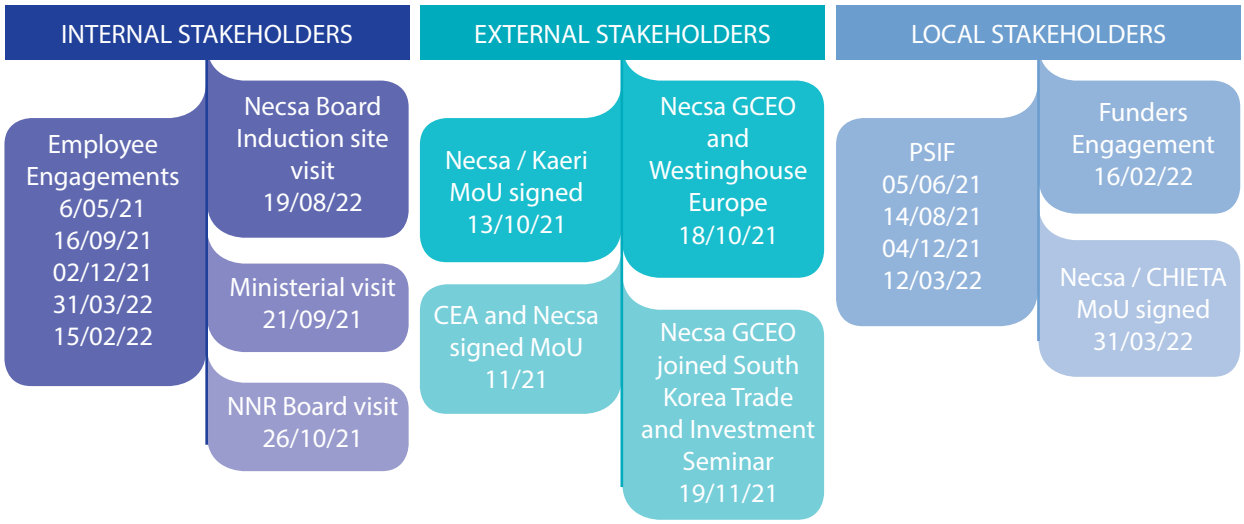
GCEO staff engagement session

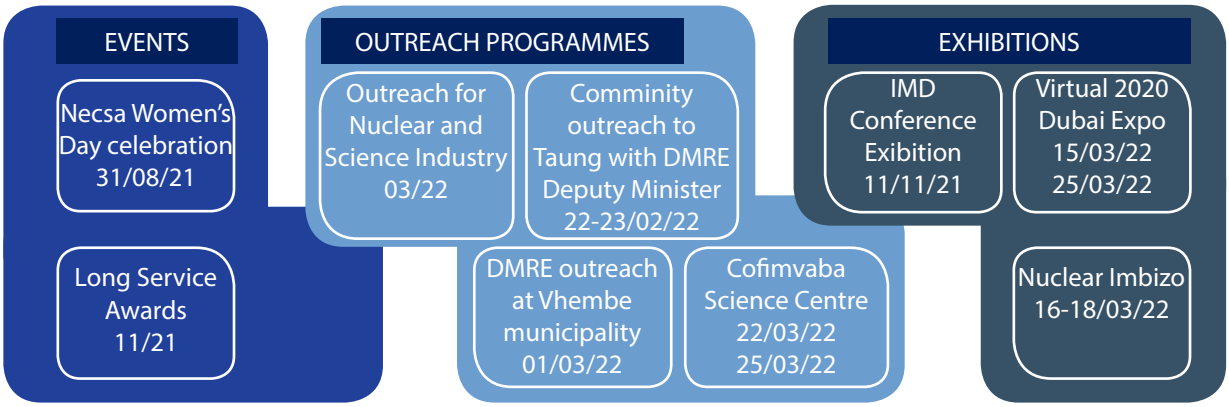
6.1.5 CORPORATE COMMUNICATION AND STAKEHOLDER RELATIONS (CCSR)

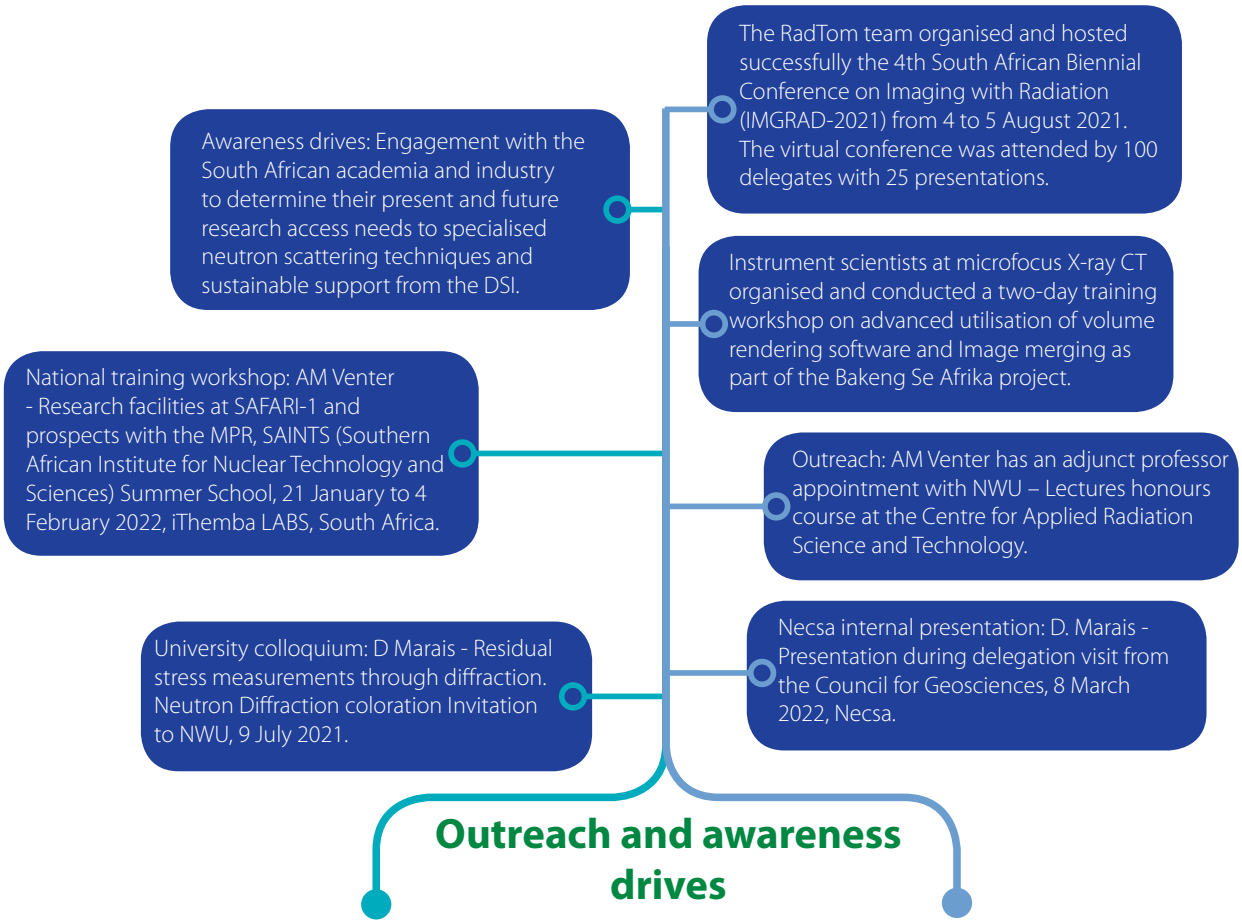


6.1.5.1 STAKEHOLDER RELATIONS

The mandate of Stakeholder Relations (SR) is to promote the Necsa's direct strategic engagement with key stakeholders in the nuclear industry and broader formations within South Africa. It is responsible for the Necsa Visitor Centre (NVC) that allows ordinary citizens an opportunity to experience the history of nuclear, the role played by nuclear technology in society, developments thereof and what the Necsa entails. This is also a platform used to promote public awareness on nuclear and its applications.







6.1.5.2 CORPORATE COMMUNICATION AND MEDIA LIAISON

Corporate Communication and Media Liaison is responsible for managing internal and external communication, media liaison as well as the Necsa corporate brand identity. Internal communication ensures that there is an information sharing culture within the Necsa Group and encourages two-way flow of communication between employees and management. External communication via different platforms creates public awareness and brand image positioning for the Necsa. Though traditional and social media platforms, the Necsa communication is able to reach a broad spectrum of audience.

On the internal communication front, the Necsa Group implements daily internal communication via email (Necsawide) and bulk SMS and recently introduced screen savers to share important information and create awareness on different topics. In addition, there is GCEO Communique as well as a generic quarterly newsletter (***Necsa Today***) with business-related news that is shared with staff.

Table 7: Internal Communication

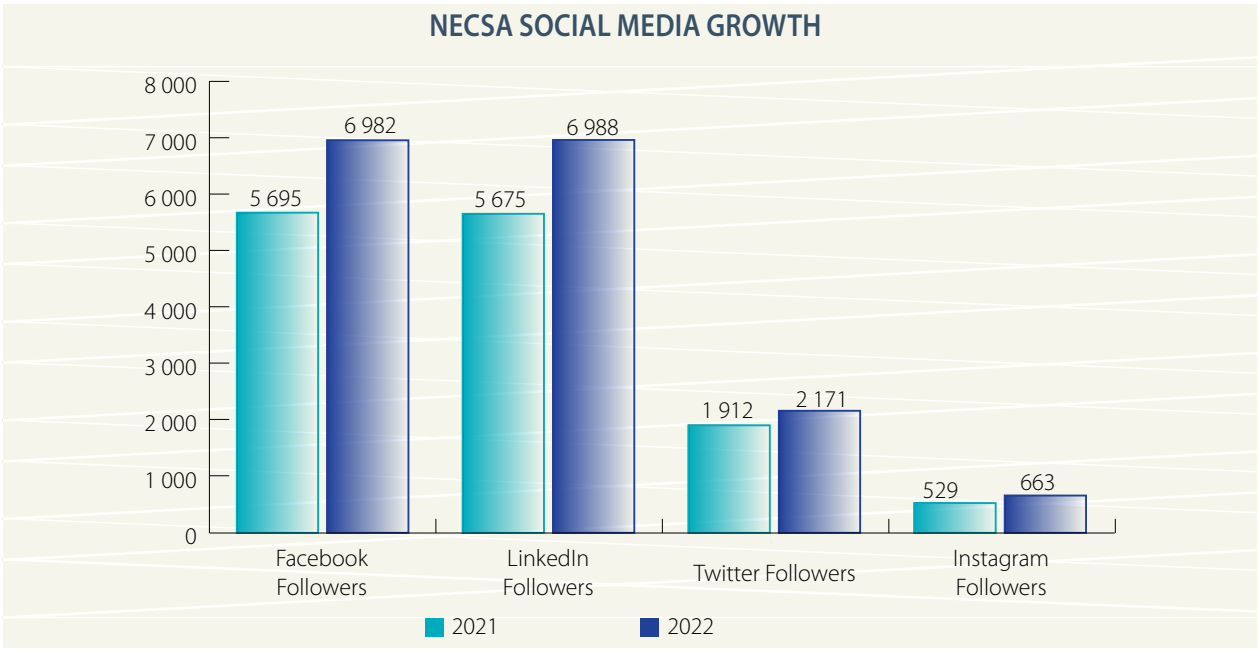
Necsawide (E-mail)/SMS	Necsa Today (Internal newsletter)	GCEO Communique
Daily	4	12

The Necsa website forms part of the external communication platform and it has embedded interactive pages where the public can engage or request information from the organisation. Website traffic is monitored monthly to observe which pages are visited the most and by which part of the population.

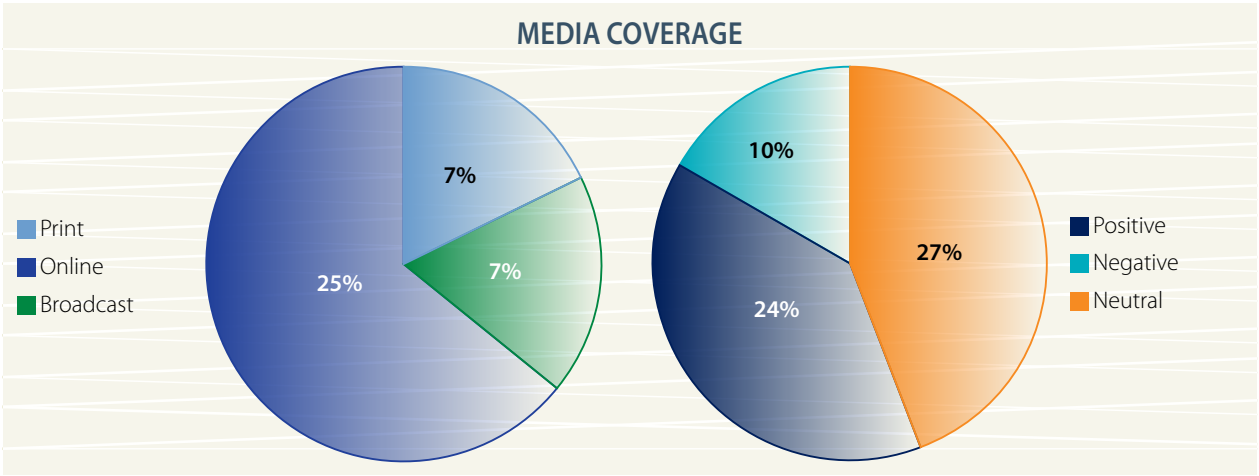
During the financial year 2021/22 the media strategy focused on regaining the organisations's reputation. The turnaround strategy for the Necsa Group, as far as media liaison is concerned included issuing media statements on a number of projects that the organisation is embarking on to attract positive coverage. In addition to that, the GCEO as well as the Board Chairperson participated in a number of media interviews. This is all in an effort to change the negative perception of the Necsa after making headlines for the wrong reasons in the past years.

The Necsa's social media pages gained good momentum over the past years since they were first generated. We have seen a gradual increase in terms of the followers' base, with LinkedIn taking a lead with a high followers rate increase. The Necsa's social media platforms are mainly used to communicate key organisational milestones as well as creating awareness and educating the public about the work done by the organisation. Social media also plays a crucial role in marketing and the Necsa's brand positioning.

Below is the graphical depiction of the social media growth to date:



Notable positive media coverage during the 2021/22 financial year. The graph below depicts categories of media platforms (print, broadcast and online) and the type of coverage received as a result of media statements issued as well the general coverage on the Necsa:



The graph below gives a presentation of media statements issued during the 2021/22 financial year as well as the number of media interviews conducted by the GCEO and the Board Chairperson on different issues and platforms.

36 PERCENT

Media Statements:

- 2500MW Nuclear Energy Section 34 support.
- Multipurpose Reactor Cabinet approval.
- MPR RFI release
- CHIETA signing MoU with Necsa.
- Necsa signing MoU with KAERI.
- Rare Earth Refiners.
- NNR public hearings on Thyspunt site.
- Rhisotope Project with Wits University.

Media Interviews

- eNCA on RFI release.
- Newzroom Afrika on RFI.
- Radio 702 on RFI.
- SAFM Radio – Sunrise Show on RFI.
- Engineering News on MPR.
- Umhlobo Wenene FM on NNR public hearings on Thyspunt site.
- eNCA on Russia/ Ukraine.
- Newzroom Afrika on Russia/Ukraine.
- Lesedi FM on what nuclear is all about.
- SAFM - Nersa's decision regarding approval of 2500MW of nuclear power.
- SAFM – Panel discussion on Eskom's big renewable energy investment plans.
- SABC TV – Eskom/Load shedding.
- Salaamedia – Eskom and the power crisis.

64 PERCENT

6.2 STRATEGY AND BUSINESS ENABLEMENT

6.2.1 COMPLIANCE AND SAFEGUARDS

Compliance

Compliance with authorisations and regulations is implemented through the SHEQ-INS system. The SHEQ-INS System documents the Process-Based Licensing (PBL) which address the required National Nuclear Regulator (NNR) approved processes and other statutory and regulatory requirements applicable to the Necsa group.

The SHEQ audit function forms part of the compliance assurance of license and authorisation conditions. However, it was found that the implementation of license conditions specific to the facility was not receiving adequate attention in terms of compliance assurance. Hence, the Compliance Assurance Enforcement Inspectorate (CAE) was established in the 2018/19 financial year with the mandate of ensuring that license and authorisation conditions from the NNR and South African Health Products Regulatory Authority Department of Health (SAHPRA): Radiation Control among other authorities are adequately and effectively implemented at the Necsa facilities.

The two compliance assurance functions, i.e. SHEQ Compliance and Audits and CAE augment each other in the following manner:

- SHEQ Compliance and Audits: sample-based audits to verify implementation and ensure compliance with SHEQ-INS system requirements, i.e. facility management systems.
- CAE Inspectorate: regulatory inspections to verify the implementation and ensure compliance with the Facility Nuclear Installation License, Safety Assessment Report, Operating and Technical Specification, In-Service Inspection Programme, relevant SHEQ-INS and facility-specific requirements relating to the identified area, i.e. process.

Despite the limited staff complement of two inspectors, CAE completed sixteen physical regulatory inspections at various facilities covering the topics of Emergency Preparedness, Waste Management and Occupational Hygiene, as well as

tracking, monitoring and reviewing facility actions plans from previous inspections to ensure corrective actions are identified to prevent recurrence of any identified non-compliances.

Safeguards

The Republic of South Africa and the International Atomic Energy Agency (IAEA) are parties to the Comprehensive Safeguards Agreement (CSA), INFCIRC/394, for the application of safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons which entered into force on 16 September 1991. The parties further signed the Additional Protocol to the Safeguards Agreement (AP), INFCIRC/394/Add.1, which entered into force on 16 September 2002 in order to strengthen the effectiveness and improve the efficiency of the safeguards system as a contribution to global nuclear non-proliferation objectives.

The Minister of the DMRE acts as the national authority of the Republic for the purposes of the implementation and application of the Safeguards Agreement and any additional protocols under Section 33 of the Nuclear Energy Act (1999) in order to timeously detect and identify nuclear material intended to be used for peaceful nuclear activities and deter the diversion of such nuclear material to the manufacture of nuclear weapons or other nuclear explosive devices or for use in connection with any other purpose that is unknown.

The Minister has delegated the authority for the above mentioned function to the Necsa Board of Directors. Necsa safeguards the Department, on behalf of the Minister, ensuring compliance to the safeguards requirements in accordance with the CSA and the AP.

The process of withdrawal of the safeguards function from Necsa is still ongoing as per the DMRE Minister's request in August 2020.

Inspection activities and additional protocol

All inspections carried out during the reporting period met the IAEA Safeguards requirements and were conclusive. The annual additional protocol declarations were submitted to the IAEA as required by the Protocol Additional to the Comprehensive Safeguards Agreement in May 2021 and were accepted as satisfactory by the IAEA. Having evaluated the results of safeguards activities and all other available safeguards-relevant information for South Africa, the Agency found that there was no indication of diversion of declared nuclear material from peaceful nuclear activities and no indication of undeclared nuclear material and activities in the State. On this basis, the Agency concluded that all nuclear material in South Africa remained in peaceful activities during the reporting period.

This conclusion confirms South Africa's strong commitment towards non-proliferation as well as our ability to fully utilise nuclear energy and technology peacefully to contribute to our socio-economic development.

Safeguards Bilateral Meeting with the IAEA

Non-Destructive Assay

The High Activity - Active Well Coincidence Counter (HA-AWCC) project that was initiated by SA in collaboration with the USA to develop a technique to quantify the U-residues at NTP is still on going. The Oakridge National Laboratory (ORNL) team visited Necsa in March 2022 to assist with repairing the Counter detectors that were defective. The custom-built neutron counter is designed, manufactured and installed at NTP for characterisation of the uranium residues.

Establishment of the Comprehensive Test Ban Treaty Organization (CTBTO)

International Monitoring System (RN62)

Necsa is the designated authority for the establishment, operation and maintenance of the CTBTO International Monitoring System (IMS) to be stationed in Cape Town. The proposal for infrastructure upgrade on the IMS (RN62) project was aligned with the allocated project budget through consultation with CTBTO including negotiations regarding establishment of infrastructure, installation support, liaison and other support services for the radionuclide particulate station are due for completion.

The Non-proliferation Council has established the CTBT Coordinating Committee, an interdepartmental committee comprised of all relevant stakeholders to discuss and advise the Council on matters connected to the implementation of the CTBT in South Africa including IMS (RN62) project. The Necsa has been a member of the CTBT Coordinating Committee since inception in 2014.

6.2.2 LICENSING AND SAFETY ANALYSIS

Safety services

The Safety Services Department is responsible for health and safety functions which includes health and medical services, radiation protection, conventional safety support, emergency services and emergency preparedness as well as SHEQ management system compliance and auditing.

Safety performance

Necsa's Disabling Injury Incident Rate (DIIR) was at 0.67 for the reporting year. There were no nuclear occurrence with International Nuclear Event Scale (INES) rating of above 0. SHEQ audits were not performed as per norm due to Covid, however to manage the compliance risk alternative compliance verification method was approved for implementation. Key aspects in each department were verified for compliance in line with the approved alternative process.

Emergency preparedness

Six emergency exercises were conducted in the reporting period to test readiness in case an emergency occurs. On 26 January 2022, Necsa was subjected to a Regulatory Nuclear Emergency Exercise initiated by the NNR. Findings in the form of non-compliances (deficiencies) and observation (areas of improvements) were identified, which need to be addressed for further improvement of emergency plans and procedures. The regulator concluded that the Necsa demonstrated satisfactory application of emergency preparedness and response actions and the Necsa Emergency Plan remains viable for the protection of persons, property and the environment.

Covid-19

Since the declaration of national disaster for Covid-19, the Necsa's disaster management task team has been monitoring the Covid-19 cases and implementing measures to curb the spread of the virus. From March 2020 to end March 2022, the Necsa sites had 428 reported Covid-19 positive cases. Of these 428 cases, 417 recovered and 11 passed away.

Compliance with Water Permit Requirements

Compliance is measured against Water Permit number 1874B. The tables below reflect the effluent generated during the water year from 1 October 2020 to 30 September 2021 as well as the effluent discharges for the same period. The Pelindaba West Pans (PW 9-14 with a capacity of 14 748 m3) and Beva Pans (PW A-C and 1-8 with a capacity of 16 054 m3) are excluded since they are not receiving effluent.

Compliance with Air Permit Requirements

The total fluoride gas emissions for the January 2021 to December 2021 period (calendar year) amounted to 2 203kg, which was higher by 756 kg compared to the previous year's (2020) of 1 447 kg. The monthly site limit was not exceeded during the year. Total fluoride gas emissions for the reporting period were 12 % of the annual air emission license constraint of 17 695 kg/year.

Compliance with Environmental Requirements of the Nuclear License

No nuclear occurrence related to the environment occurred during the 2020/21 financial year. Radiation dose to the public, as modelled on actual authorised releases, indicates that there was no significant dose impact to people or the environment due to the Necsa's activities.

Table 8: Liquid Effluent Generated for period October 2020 to September 2021

Effluent Destination	Volume (m^3)	Permit Llimit (m^3)	Percentage of Permitted (%)	Percentage Change Year-on-Year (%)
Crocodile River	94 978	250 000	37.99	-6.26
PE Pans 1-5	18 287	19 000	96.25	335.40
PE Pan 6	2 000	8 500	23.53	0.00
PE Pan 9	2 422	15 000	16 15	-9.96
PE Pan 7	0	4 500	-	
PE Pan 8	60	4 500	1.33	140.00
CAF_2	0	941	-	-100.00
Total	**117 747**	**297 000**	**39.52**	**6.57**

Table 9: Discharges of industrial effluent and low active effluent to the Crocodile River – October 2020 to September 2021

	Q4 (2020) Oct- Dec LE-REP-0718	Q1 (2021) Jan-March LE-REP-0694	Q2 (2021) Apr-Jun LE-REP-0701	Q3 (2021) Jul-Sept LE-REP-0708	YTD Oct 2020 Sept 2021
Industrial effluent(m^3)	24 183	21 857	27 582	17 947	91 569
Low active effluent (m^3)	1 030	886	679	814	3 409
Total effluent Discharged to Crocodile River (m^3)	25 213	22 743	28 261	18 761	94 978
Dose impact (µSV)*	0.68	0.61	1.02	0.61	2.92

Table 10: Modelled dose to the public			
	2019 Calendar year mSv	2020 Calendar year mSv	2021 Calendar year mSv
Liquid to Crocodile River	0.0034	0.0029	0.0029
Gaseous releases	0.0006	0.00076	0. 0014
Total	0.0040	0.0036	0.0043
% of the annual public dose constraint (0.250 mSv)	1.597 %	1.457%	1.72 %

Modelled Dose to the Public

The environmental monitoring programme at Vaalputs was in full compliance with sample reporting levels. No environmental nuclear occurrences were registered.

6.2.3 INFORMATION TECHNOLOGY (IT) INDICATORS

The IT function at the Necsa is provided through Systems and Information Management in the Office of the CIO. The IT function mainly provides the following services to the Necsa and its subsidiaries Pelchem and NTP, to a limited extent:

- Enablement of business objectives through the use of ICT.
- The development and maintenance of software applications.
- The implementation and maintenance of enterprise wide systems and infrastructure such as network, e-mail and Internet.
- The provision of telecommunication services including landline, cellular communications and services.
- The provision of support services for any problems/faults on any other related IT issues.
- IT management and governance.
- Information security.

IT governance

During the last financial year, the IT Department was involved in sustaining the safe operations of the company which were predominately performed under Covid-19 conditions, of a hybrid work environment i.e., work from home, or office. The IT Department provided increased support and information security where high risks have been identified and the budget was allocated to replace aged infrastructure.

IT projects

The following IT projects were undertaken during the reporting year and the status is recorded as follows:

- Data security system.
- Project management system.
- Email management system.
- Intrusion protection system upgrade.

IT performance

Table 11: The following availability, capacity and problem resolution targets were achieved for the reporting period			
Metric measured	Description	Score achieved	Target
Average system availability	This metric measures the availability of applications and the supporting hardware and networking devices.	99.00%	99.99%
Average storage capacity	This metric measures the availability of space on the Necsa storage area network.	70.80%	<75%
Average turnaround percentage	This metric measures the percentage of problems resolved within a specified period.	87.00%	90 %

6.2.4 SECURITY

The objective of the Security Services department is to implement and ensure compliance to security measures at the Necsa's sites. Security measures are implemented on a graded approach with sufficient defence-in-depth at each facility based on IAEA facility categorisation guidelines combined with the current design basis threat. In accordance with international best practices, security is achieved through implementation of security measures applying the defence-in-depth principle. This varies per facility based on its risk profile in nuclear and chemical facilities to prevent unauthorised removal of assets including nuclear material and/ or potential sabotage. As a National Key Point (NKP) in terms of the National Key Points Act (Act 102 of 1980), Necsa is evaluated on an annual basis to determine effectiveness of implementation of the NKP requirements.

The NKP Office of the South African Police Service (SAPS) performs the security evaluation focusing on management of the security operations, administration of the security officers, and the adequacy of the physical protection measures. Due the Covid-19 pandemic during the reporting period, the NKP could not perform the annual security evaluation at the Necsa site. A self-assessment was conducted and results thereof submitted to the NKP for evaluation. The Necsa Joint Planning Committee, established in terms of the NKP Act (1980) brings together various stakeholders such as the SAPS, the State Security Agency, the Necsa, the Madibeng Municipality and the NNR. The Committee met three times during the 2020/2021 financial year, but were in constant contact regarding Covid-19 protocols to provide guidance, and evaluate security and emergency processes for the site.

Pelindaba access point

Table 12: Security related system upgrades undertaken during 2021/ 2022	
Access control systems	Work started to migrate remaining facilities from Bes access to Cardax access control system including visitor management module.
Pan tilt and zoom camera surveillance system	Construction of surveillance system upgrade on selected facilities.
Concrete path	Construction of concrete path way in selected area's to enhance security patrol and response capability.

6.3 RESEARCH & INNOVATION (R&I)

The mandate of the R&I division is to grow and maintain core research capacity in line with the Necsa mandate.

1) Radiation science;

2) Applied chemistry;

3) Radiochemistry.

In addition, the R&I Division houses the Office of Technology Transfer (OTT), which is mandated in terms of the Intellectual Property Rights from Publicly Financed Research and Development Act (IPR Act, 2008) to facilitate the identification, protection and exploitation (or commercialisation) of intellectual property (IP) developed and owned by NECSA. This makes the R&I Division an important player in the National System of Innovation (NSI) with regards to establishing a knowledge-based economy with specific emphasis on the nuclear and radiation sciences.

R&I has grouped its research capabilities and related technologies into the following Strategic Impact Areas as per the Necsa Corporate Plan:

1. Medical diagnostics and therapy;

2. Industrial applications of radiation;

3. Clean energy;

4. Material beneficiation;

5. Waste conditioning (nuclear and non-nuclear waste).

Each of these impact areas has several niche technologies which have potential to lead to commercial products and services, thereby contributing towards exploitation of publicly funded research and development. The generic R&I organisational model is schematically shown in Figure 1.

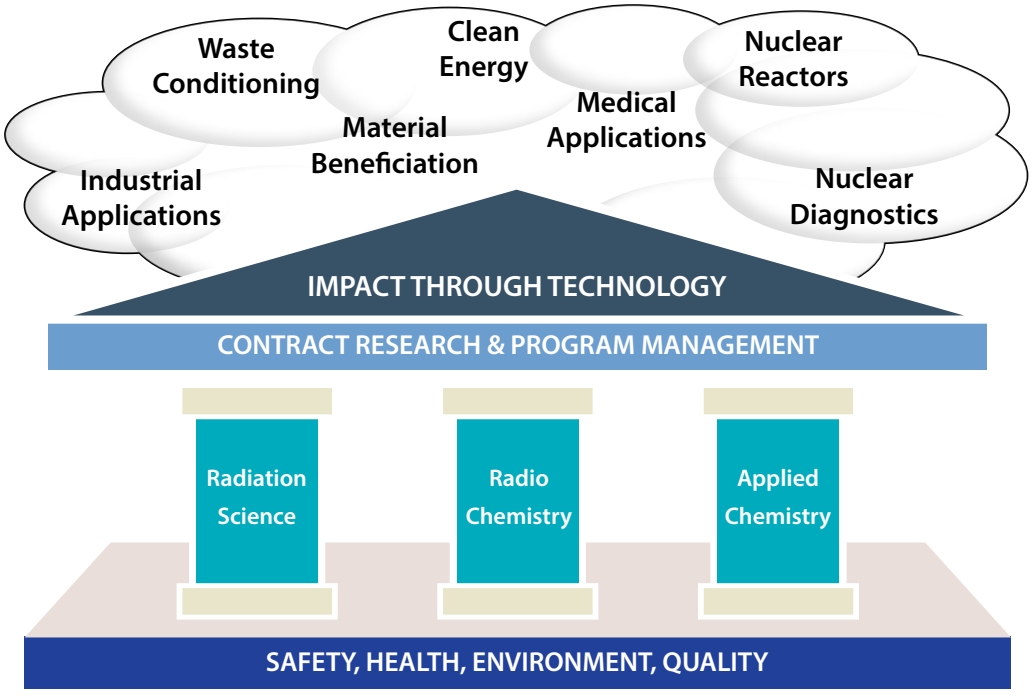


Figure 1: Schematic of R&I foundations, core skills, coordination and impact

The R&I Division has a steadily growing number of clients that are served, through contract research, in the respective impact areas. The Necsa subsidiaries, in particular, are provided with focused research support in order to maintain a competitive advantage and to expand their existing product portfolio. A systems-engineering approach (based on technology readiness levels) to product development is followed. Core science and technology activities are supported by project and programme management. In order to benchmark and strengthen its own capabilities, close collaboration with national and international collaborators is actively pursued. Safety, quality, health and environment are of uncompromising essence to R&I.

Summary of main research outputs

Apart from commercial and institutional related programmes outputs, which will be discussed in more detail under the different departmental activities, the knowledge dissemination related research outputs of the R&I division can be summarised as follows:

Table 13: Knowledge dissemination research outputs

Type of Output	Number
Innovation disclosures	7
Peer-reviewed publications	36
Technical and contract research reports	39

A list of journal publications can be found at the end of this Annual Report.

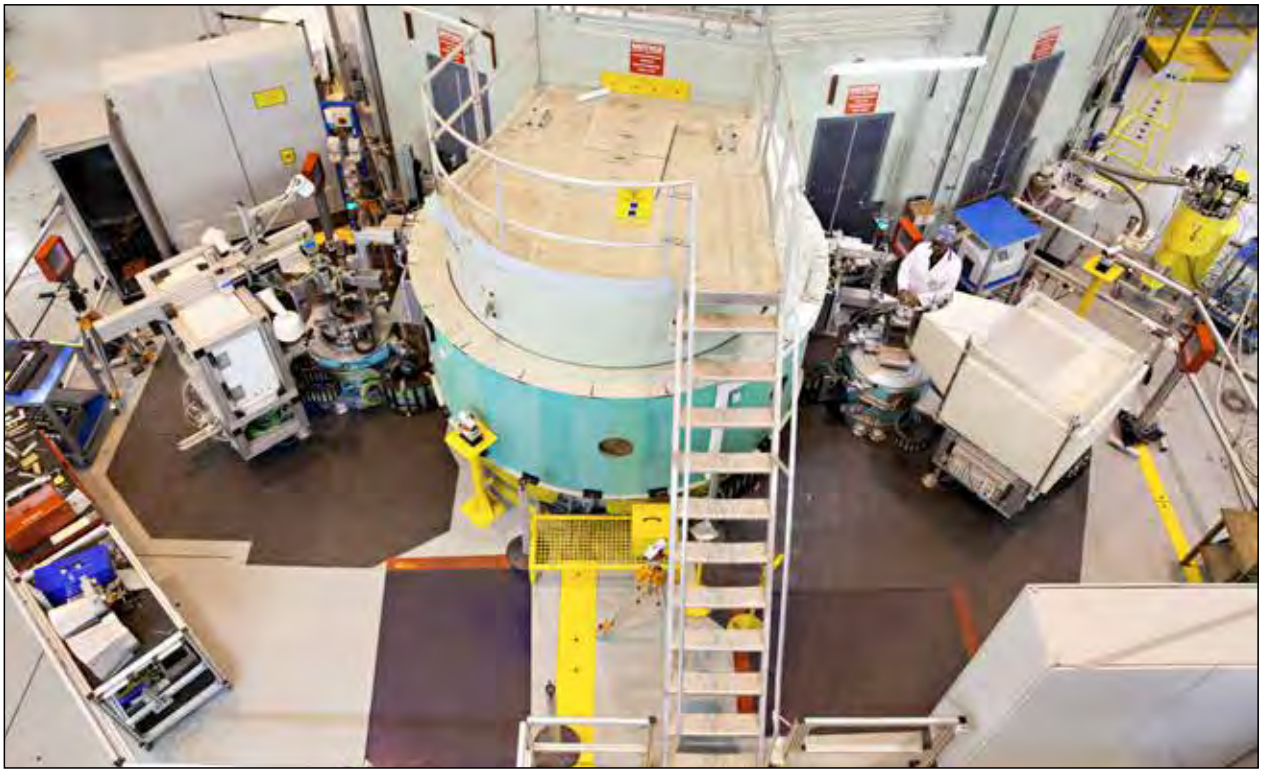
The main activities and notable performances of the R&I Division during the 2021/22 financial year are highlighted.

6.3.1 RADIATION SCIENCE DEPARTMENT

The purpose of the Radiation Science Department is to establish, grow and maintain:

- High level expertise in reactor simulation and calculational capability.
- High level excellence in reactor and radiation related programmes and initiatives.
- Internationally competitive research facilities manned by expert instrument scientists. e.g SAFARI-1 Beam Line facilities.
- A user community that grows the research within the National System of Innovation.
- Human Capital development by supporting high level training and research project study support at Necsa facilities.
- Alignment toward synergy within the National system of innovation such as iThemba LABS).
- Continued IAEA participation through Technical Cooperation and skills exchange programmes.
- Participate with international flagship activities such as the BrightnESS2 project with the European Commission.
- Provide new nuclear technologies, products and services that can compete on the international market.

In this section of the report, progress and innovative developments in these areas will be highlighted.



Beamline

Radiation Science highlights

- The need for a specific and more comprehensive data acquisition system has grown in parallel with the developments of Smart Radio-Sensors, one that is applicable to the unique nature of our technologies while being adaptable to specific industrial problems. To address that, development of the Data Acquisition Logging and Analysis System (DALAS) is ongoing, which will be a comprehensive FPGA (Field Programmable Gate Array) - based system developed with the Fourth Industrial Revolution (4IR) principles in mind. The system will perform acquisition, storing and fast real-time analysis of input data, and the output will be tailored to the needs of the application with the intention to impact industrial applications.
- The R&I team in collaboration with the University of Johannesburg, continues development of the project dealing with Optical Fibre Bragg Grating (FBG) sensors which can serve as a 4IR solution to monitor online, the in-core temperature and dose level in a power reactor environment to increase the efficiency of operations and safety. Initial experiments showed a favourable response of these optical fibres to high radiation environments, with the next phase of testing to commence in the next financial year.

Industrial application impact area projects

- The Smart Radio-Sensors form a complete system that will include the tagging of elements with a gamma emitting source, its detection and analysis, the output from which will provide tailored information to meet the needs of a specific application. The investigations under this area deal with the ability to tag and locate a shroud dislodged during mining operations, monitoring the erosion of hydrocyclone wall linings and the development of a comprehensive DALAS system. A demonstration unit together with Gammatech was successfully assembled and demonstrated to investors such as TIA and IDC. The filed patent (Tagged Excavation Element) has been granted in the SA, USA, ARIPO, Russia and China.
- A further area that is being investigated deals with the ability to monitoring wall abrasion of industrial hydro cyclones.

Radiation calculation support

- Fuel and core management in the form of reload and core-follow safety calculations

for SAFARI-1 are routinely performed. Such analyses are used to ensure that the planned operational cycle adheres to all safety and utilisation requirements. The focus during this year was on improving the quality of the SAFARI-1 computational model and broadening the scope and detail of the safety and utilisation analyses performed. Such improved analyses enhance the safety of the reactor and supports the improved utilisation of the SAFARI-1 reactor.

- Overall, calculation and analysis services are performed to support the safety and licensing related submissions at the Necsa. The Radiation Reactor Theory (RRT) was involved in a number of projects in support of internal and external clients (such as SAFARI-1, NTP, STL, Eskom) in the areas of shielding, material activation and criticality assessments. This also includes analysis support to NTP with regards to isotope yield prediction, safety assessment and product transport. Additionally, a large amount of effort was directed towards ensuring compliance to the NNR regulatory requirements for the verification and validation of calculation models used in safety and design analysis. The RRT has met all defined service level agreement (SLA) and audit targets during the year.
- During this year, the RRT section started with the thermal-hydraulic/neutronic re-assessment of the SAFARI-1 SAR accident scenarios, as part of the periodic safety review of the reactor. This work requires that all design-based accidents are calculated with appropriate simulation packages, and to confirm that the technical operating specification of the reactor is in line with best-practice approaches, as well as local and international safety requirements.
- The RRT section was heavily involved with the feasibility study of the proposed new South African research reactor (termed the MPR project). The RRT performed computational assessments in support of the development of the proposed user requirements specification of the reactor. As part of this work, a number of international research reactors were modelled in great detail to assess what would be the state-of-the-art capabilities available when procuring a research reactor.
- During this year, the RRT had many interactions with Eskom regarding the Original Steam Generator (OSG) replacement project, and in particular with performing the shielding design for the interim storage facility of the steam generators. The RRT was further engaged to assist with interim solution strategies and updated shielding calculations when it became clear that the construction of the storage facility will take longer than expected. Support on this project will continue into the next financial year.

Radiation Science user facilities at SAFARI-1

The Diffraction laboratory offers unique capabilities within the African continent by enabling the utilisation of thermal neutron beams and laboratory generated X-ray beam techniques as complementary probes of crystalline materials at the microstructural level. The laboratory is equipped with four modern instruments dedicated to applications such as chemical phase identification, chemical phase quantification, magnetic phenomena, as well as residual stress analyses. The facilities are instrumental in the non-destructive determination of depth-resolved stresses in additive manufactured components produced using different build techniques and strategies. In addition these have contributed to the benchmarking of predictive models.

The facility expertise and performance have been instrumental to the development of a Neutron Quality Label in conjunction with two premier stress instruments in Europe and one in the United Kingdom (UK). The aim of this standard is to instill confidence with industry regarding the accuracy and consistency of the neutron stress technique and interchangeability between neutron strain scanners from different institutes. In addition, the Necsa facility could potentially accommodate international user access with a number of facilities presently unavailable due to facility upgrades.

- The Diffraction Group plays a pivotal role within the Neutron Beam Line Centre as developing future hub in research utilising neutron beam techniques at the new MPR. It is envisaged that the instrument suite would facilitate studies of matter at extensive length and dynamic ranges to substantially expand the capabilities that exist at SAFARI-1.

- Radiation imaging facilities, equipped with a microfocus X-ray CT, CT analytical laboratory and neutron radiography (under upgrade) offers a unique capabilities to researchers, students and industries in non-destructive investigation. The micro-focus X-ray and CT analytical laboratory were fully operational - 20 students, 8 researchers and 2 commercial clients benefitted from its use during this reporting period. The studies conducted have application in geology, zoology, anatomy, biomedical, dentistry, chemistry, palaeoanthropology, anthropology, archaeology and engineering. The two commercial projects have application in medical implant and climate change.
- The CT laboratory still support the Bakeng se Afrika, a European Union co-funded project with the goal of creating a digital repository of micro-XCT scanned skeletal elements of South African individuals. The support of new MPR was done through the completion of the work request to calculate minimum floor loading via shielding simulation. An important element in the establishment of the Neutron Beam Line Centre at MPR.

Contract research projects

Projects have been conducted within the BrightnESS[2] (Bringing Together a Neutron Ecosystem for Sustainable Science with ESS) programme (funded by the European Union Framework Programme for Research and Innovation Horizon 2020), as well as the South African MPR project. The following have been achieved:

- BrightnESS[2]:
  - Report on "***South African "User Needs" Pertaining to Neutron Scattering***" – Deliverable 2.4. A significant outcome from this engagement with the South African academia and industry is the continued support by BrightnESS[2] established as promotional publication on the outcomes.
  - Report on ***"Pilot Project for a Neutron Quality Label for Residual Stress Analysis: Development for a Common Calibration Protocol"*** – Deliverable 2. A significant outcome of this collaboration is the Neutron Quality Label (NQL) that is proposed as a quality standard for residual stress analysis using neutron diffraction, following a prescribed calibration guideline and reporting requirements.
- MPR: Projects to determine key specifications of the MPR towards maturing the User requirement specification as output of the feasibility phase of the project:
  - ***"MPR beamline URS modelling support project: Floor loading determination for neutron radiography facilities at the MPR".***
  - ***"MPR beamline URS modelling support project: Ray tracing simulations"*** which includes calculations of the SAFARI-1 and OPAL beam line flux characteristics.

Radiation & Reactor Analysis Services & Products (RRASP) (Clean Energy impact area project)

Radiation and Reactor Calculation Support

- Fuel and core management in the form of reload and core-follow safety calculations for SAFARI-1 are routinely performed. Focus was mainly on improved temperature calculations for fuel and molybdenum target plates and building thermal-hydraulic support capabilities, shielding design calculations for the Eskom Koeberg steam generator replacement project, fluence calculations for the SAFARI-1 biological shield and numerous safety calculations for NTP isotope transport and storage casks.
- Overall, calculation and analysis services are responsible for supporting most safety and licensing related submissions at the Necsa. A large amount of effort into ensuring compliance to the NNR regulatory requirements for the verification and validation of calculation models used in safety and design analysis was done with the outputs of the shielding work being audited by the NNR as part of the contract work done for Koeberg.

Reactor code development

- The OSCAR nuclear reactor calculational system is currently in its fifth generation and was notably expanded during this year. In particular, new developments include improved multi-physics reactor operational

support, the inclusion of uncertainty propagation schemes for safety analysis, machine learning-based approaches for reactor core design and various general and automation-based enhancements for Research Reactor, Light Water Reactor and Small Modular Reactor calculational support.

- OSCAR is currently used as the primary reactor calculational platform at the SAFARI-1 reactor at the Necsa, the HFR and HOR reactors in the Netherlands, the MNR reactor in Canada, as well as at various universities. During this year, client support was largely focused on migrating existing clients to the new OSCAR-5 platform, and engaging with a number of new prospective clients for potential on-boarding in 2022.
- At present, the RRT is embarking on a new consortium-based business model for OSCAR development, which aims to accelerate the expansion of OSCAR capabilities dramatically via larger scale collaboration with strategically selected partner institutions.
- An overview of the OSCAR calculational platform, its uses, growth plans and collaboration opportunities was presented as one of the showpiece projects in the South African/DMRE pavilion at the Dubai World Expo in March 2022.
- The RRT manages the full pipeline of technology development for the OSCAR system, and strongly focuses on early-stage research in new computational methods and models. The majority of the RRT's peer-reviewed publications and conference contributions were generated to showcase current and upcoming capabilities in the system.

International collaborations

- IAEA technical cooperation project, SAF2020003, ***"Strengthening industry, infrastructure and innovation through utilisation of national Research Reactors"*** is effective over the period 2022 – 2025.
- Future Industries Institute, University of South Australia, on additive manufactured titanium.
- Developers of the McStas neutron ray-tracing project to improve the perfect bent crystal monochromator model.
- Department of Mechanical Engineering at the University of Texas, Dallas campus, determination of residual stresses in direct energy deposition (DED) additive manufactured steels.
- RadTom group member was part of an international IAEA team of experts on neutron radiography that provided training and expert advice during the AUNIRA-2021 workshop.

Recognition

The expertise of the Necsa's RS division has gained national and international recognition, showcased by the fact that:

- Access to international neutron facilities, based on peer reviewed research proposals, has been awarded to RS staff members at beam line facilities of the IBR-II reactor at the Joint Institute of Nuclear Research, Russia.
- RS personnel serve on various international committees: International Scientific Committee of MECA SENS (MECA SENS: Mechanical Stress Evaluation by Neutron and Synchrotron Radiation). New Opportunities for Better User Group Software (NOBUGS) International Advisory Committee. Executive Committee and Strategy and Policy Committee of the African Light Source (AfLS).
- RS personnel serves on various national committees: The South African Committee of the International Union of Crystallography. Chair of SRRIC (Synchrotron Roadmap Implementation Committee) as well as ***ad hoc*** review tasks for the National Research Foundation (NRF) such as researcher rating applications.
- RS personnel serves on various technical committees: The board of the DSI-NRF Centre of Excellence in Strong Materials. An expert panel of the IAEA to establish a reference document on ***"Neutron Scattering with Low and Medium Flux Sources"***.
- The quality of RS personnel is highlighted by the awards and ratings granted by the NRF, with four researches holding an NRF rating and two awarded NRF grants based on quality research proposals.

- A NFR rating is an esteemed honour for scientists as it shows the excellence in quality of work done and the ability to work within the NSI; with three researchers holding NRF ratings.
- The expertise of RS personnel is also highlighted by their invitation to review proposals from international facilities like ANSTO and review/referee manuscripts submitted to ISI journals.
- Dr RH Prinsloo was appointed as Extraordinary Associate Professor at the NWU and also received a C1 scientific rating from the NRF in this year.
- Dr PM Bokov was re-appointed for a second term as Adjunct Professor at the North Carolina State University (NCSU) Nuclear Engineering Department. Dr Bokov also holds a C1 scientific rating with NRF and an appointment as Extraordinary Associate Professor at NWU.
- Members of the RRT were invited by international universities to act as external examiners for PhD theses during the year.
- Three members of the RRT were registered as Natural Scientists with the South Africa Council for Natural Scientific Professionals (SACNASP) during the year.
- Several RRT scientists acted as regular reviewers for the various high-impact factor journals in the nuclear engineering field.
- A RadTom group member was recognised as part of an international IAEA team of experts on neutron imaging.

6.3.2 APPLIED CHEMISTRY DEPARTMENT

The main focus of the Applied Chemistry Department is the development of commercial processes, contract research and to maintain the basic chemistry technology platforms required by the Necsa. During the past financial year the bulk of the effort went into contract research for both internal and external customers. The commercialisation projects that are currently running within the department are all funded from external institutions. In the cases where technology platform work was either individually funded or formed part of another funded project, work commenced as planned. However, where the technology platforms were funded by the Necsa, these projects were moved to an idle speed where only internal man-hours were focused on mostly theoretical studies and therefore no external funds flowed into these projects.

Main core skills areas are in: Nuclear fuel cycle-related materials beneficiation; plasma-based material modification and processing; waste conditioning technology; and fluorine technology. Important NSI programmes, such as the Energy Storage Programme and the Advanced Materials Initiative (AMI) programmes of the DSI reaped significant benefit from the research involvement of the Applied Chemistry Department, through the R&I's specialised core skills.

Applied Chemistry highlights

Contract research

As mentioned above, the majority of man-hours during this financial year was spent on performing contract research. Of this a big part was in support of the larger Necsa D&D, Stage 1 programme managed by the NLM. To this a number of works orders were received to process existing waste piles via chemical processes as well as plasma treatments.

The chemicals processes under development are aimed at extracting the harmful radioactive compounds from the waste to firstly render the resultant bulk waste safe to dispose of either on commercial waste sites or if needed as Low and Intermediate Level Waste – Short-Lived (LILW-SL) at Vaalputs. The recovered material will then be further purified with the aim of recycling of this material where possible. Three of these projects have started and are currently in the exploratory research phase.

The plasma research on D&D work are focused on either recovery of valuable radioactive material or to reduce volume of the waste by the Necsa plasma gasification (PlasGas) system. This system was in the past successfully run on non-radioactive waste at a 0.1 ton/day scale and subsequently demonstrated on a 0.5 ton/day, larger system. During this year, in cooperation with Pelindaba Enterprises, the basic engineering design for the system was 80% completed.

Plasma gasifier

Related to the D&D plasma work, a project to use the gases generated by a plasma as fuel for an electricity generator. This process is known as the Plasma Waste to Energy System (PlasWEn). The current focus is to investigate the system with different feedstock. The system has demonstrated the ability to handle municipal waste, Covid-19 waste and plant material. This project was contracted by an external entity and it is currently 98% complete. Additional funding is now being sourced for piloting a medical waste PlasGas system.

The current projects running at the Necsa under the Advanced Metal Initiative (AMI), sponsored by the DSI, are all more focused on eventual commercial products. The largest of these are focused on producing spheroidised metallic powders for the 3D printing industry. Although South Africa is a significant producer of titanium ores, almost all of it are exported to be processed into higher value materials such as spherical Ti6Al4V that are used in the medical industry to 3D print medical implants. This project is done in collaboration with a number of external entities such as the Centre for Rapid Prototyping and Manufacturing (CRPM) at the Central University of Technology (CUT). During the past year the current laboratory scale plasma system that is used to obtain spherical metallic powder through plasma spheroidization was successfully upgraded with a system that was designed by the Necsa to run continuously. This opens the door to produce larger samples for the purpose of application testing by different industrial collaborators.

Applied Chemistry is also participating in the DSI-funded Energy Storage Consortium project. Our focus is on the modification of cathode materials in batteries with fluorine. Some molecular dynamics simulations have also been conducted to compare theoretical outputs with known literature values (experimental and theoretical) and seem to correlate very well. A process was developed to fluorinate the solid cathode material and various samples have been fluorinated for other consortium members. Samples prepared for the University of Limpopo showed very promising results with significant improvements.

Process commercialisation

Within the fluorine chemistry expertise, a project that is still funded by the DSI, is focused on the development of a commercial process to produce Lithium hexafluorophosphate (LiPF6). This project is currently aiming to demonstrate the technology on a bench scale. It is planned that this phase will be completed during the next financial year,

after which it will be handed over to business development. A Necsa patent for the production of certain pigments from plasma dissociated Zircon (PDZ) is being commercialised by an external company in association with the IDC under a license agreement. Initial samples have been produced and are currently being evaluated by potential customers.

Another patent for a process describing the production of Neodymium trifluoride (NdF3) is being commercialised under license by a different external entity. During the year, this entity successfully commissioned their pilot plant which is being operated to obtain data for scaling to commercial size.

Human Resource (HR) development

Dr Mualusi Nelwamondo from the Nuclear Waste Research section was invited to attend and present a lecture at the virtual Technical Meeting on Waste Form Performance Testing, from 12 to 23 April 2021. The title of her lecture was "***Examples of magnesium potassium phosphate waste-form development for the immobilization of 99Mo production waste"***.

Dr Nelwamondo was also invited to attend and present a lecture at the virtual Joint ICTP-IAEA International School on Radioactive Waste Package Performance Testing from 2 to 25 November 2021. The title of his lecture was "***Development and Testing of MKP Cement Waste-Form for Waste Streams from Mo-residue Processing***".

Dr Nelwamondo further attended the Third Research Coordination Meeting of the IAEA Coordinated Research Project (CRP) on Ion Beam Irradiation for High Level Nuclear Waste Form Development (INWARD), held as a virtual event from 15 to 18 November 2021. Ms Amelia Goede and Ms Jacoba Badenhorst from the Nuclear Waste Research section also presented and invited lecture at this meeting on "***Glass-ceramics for the Immobilization of H/ILW***".

Dr H Bissett is currently a co-supervisor of six post-graduate students, of which four are situated at Tshwane University of Technology (TUT), one at the CUT and another student at Stellenbosch University. Dr IJ van der Walt is currently the co-supervisor for three M.Tech students from TUT, one M.Eng from North West University (NWU), one M.Eng from Wits, one M.Sc from Sefako Makgato University and one Ph.D from University of Pretoria (UP).

The Conference of the South African Advanced Materials Initiative (CoSAAMI 2021) was held as an interactive virtual conference, from 18 to 22 October 2021. The CoSAAMI-2021 conference is a DSI initiative that seeks to address the human capital skills base and accelerate the material science capabilities. Students and their development are at the core of the conference's objectives and seeks to address human capital development and material science capabilities within the Advanced Materials Initiative (AMI) network. Research directly related to activities of the Nuclear Materials Development Network (NMDN) of the AMI resulted in the acceptance of five peer-reviewed articles to be published in a journal, while four presentations were also made during the conference.

The Necsa, along with other SOCs participated under sponsorship from the DMRE and the DTI, in the EXPO 2020 Dubai from 1 October 2021 to 31 March 2022. A presentation was made by the plasma team leaders on Plasma Gasification and Energy Recovery on 15 March. This was a hybrid conference and the entire Necsa team presented virtually.

6.3.3 RADIOCHEMISTRY DEPARTMENT

Radiochemistry continued to perform pipeline research to retain and enhance the Necsa's status as an internationally competitive radiochemical isotope producer, thus contributing to enhancing quality of life. Besides the development of radiochemicals (precursors for radiopharmaceuticals), the emphasis has shifted further down the value chain to the development of new radiopharmaceuticals. Included in this section are highlights of several product development programmes, the technology of which has matured to culminate in commercial outcomes. At early technology readiness levels, these are supported by funded technology platforms/clusters to enable the required NSI and industry partnerships. Besides the involvement in commercially orientated research, fundamental research continues that lays the basis for future innovations and products. The publication list reflects the success in the academic arena and one such article of note is a joint publication (Baumgartner, ***et al***) between Necsa and ETH Zurich which appeared in ***Scientific Reports*** (a Nature journal) in which the Necsa's preclinical work laid

the foundation for application of iron nanoparticles that increases the bioavailability of iron in iron deficient anemic women.

Radiochemistry product development programmes

A new non-invasive therapeutic for skin cancer to be produced locally for the African market (Medical Diagnostic and Therapy impact area project)

Rhenium-SCT® (Skin Cancer Therapy) is a specialised state-of-the-art skin brachytherapy that utilises the beta-emitter Rhenium-188. This therapy is indicated for the treatment of Basal Cell and Squamous Cell Carcinoma. Rhenium-SCT is a single session, non-invasive, out-patient treatment which is provided by OncoBeta GmbH (Germany), a pioneer and innovator in the epidermal radioisotope sector that currently supplies Rhenium-SCT to the European, Australian and South African markets. To investigate the feasibility of having a production site in the Southern Hemisphere, OncoBeta signed a contract with Necsa for the sample production of Rhenium-SCT for supply to customers in Africa. The initial Contract Research and Development (CRD) phase was where the Radiochemistry's hot cell was modified to accommodate their automatic synthesis unit. The technology transfer took place over three months at the start of 2020 and the first patient dose was successfully manufactured and shipped to Steve Biko Academic Hospital (Pretoria) for treatment of a patient thereafter.

In the context of Covid-19, Rhenium-SCT is considered non-critical therefore patients could not access clinics for treatment from March until October 2021. Productions resumed in the latter part of the year including a successful production and shipment to a clinic in Perth, Australia. The number of clinics able to administer the treatment in South Africa has also increased (new sites in Durban and Johannesburg). Due to the upcoming expiration of the Necsa contract in February 2022, discussions between OncoBeta and Necsa/NTP regarding the commercial setup of a Rhenium-SCT facility at the NTP for routine manufacture of the treatment was in progress. The NTP compiled a business case taking into consideration the costs associated with the facility setup which has served as an input to the negotiations regarding pricing of doses. Failing materialisation of an agreement with the NTP to secure Phase 2, the Necsa could not extend the existing contract beyond the expiry date.

CT Scan

The project has reached its end of life from a research and establishment perspective which was completed very successfully.

Development of a single vial ^{68}Ga-PSMA kit for treating prostate cancer (Medical Diagnostic and Therapy impact area project)

This project is focused on the preparation of a freeze dried PSMA-11 kit that can be compounded with generator produced Ga-68 for use in hospitals. The resulting radiopharmaceutical will be used for PET-CT imaging of prostate cancer. The market will initially be South Africa and the product will be marketed under a Section 21.

Radiochemistry is currently involved with the GMP phase of the project to demonstrate that the kits (50 vial batches) can be made under repeatable and sterile conditions prior to industrialisation. This includes developing and validating the quality control methods that are necessary for the cold kit batch release.

Radiochemical purity by HPLC method was completed. The validation protocol, validation report and method SOP was sent to the NTP for review in the fourth quarter. The RCP and RCY by ITLC method is in progress – the experimental work has been completed and the documents are being finalised. The filtration report is currently in review and once finalised will be submitted to the NTP. A User Requirement Specification for the instrument was prepared and suppliers are being sourced. Once the light box is procured, the method development and validation will commence.

Kit samples have been prepared from several production batches for both sterility and endotoxin assessment at the NTP using current validated methods. No feedback has been received on the endotoxin assessment as yet. The finalised sterility report is awaited. The mass of vials method was completed and incorporated into the moisture determination documentation as the same kit vials will be used for both qualitative control methods. The remaining PSMA-11 vials were ordered in preparation for the validation batches. For the completed methods the resulting Validation Protocols, Validation Reports and Standard Operating Procedures have already been submitted to the NTP for review.

The three validation batches will be produced once the quality control method development and validation is complete. An additional batch will be produced for shelf-life studies which are expected to continue for 7 months. The production and quality control methods will be transferred to the NTP for scale-up (Phase 3 in the Work Authorisation) while the shelf-life study is in progress. The kit production facility at the NTP (P3000) will be responsible for manufacturing batches of up to 500 vials once in routine production.

Phase I/II clinical trial for the 195mPt-cisplatinum companion diagnostic

Part A of the phase I/II clinical trial on the use of ^{195m}Pt-cisplatinum as a companion diagnostic to optimise and individualise the dose for patients, funded by the Technology Innnovation Agency (TIA) for completion of the trial preparation phase, has been completed. The next phase (Part B) is execution of the trial. A due diligence for this part was completed with TIA and a GMP license is in process in order to produce the ^{195m}Pt -cisplatinum for clinical trials. The NTP has indicated their intention to provide co-funding for execution of the trial (Part B) contingent on receipt of TIA funding. This proposal was presented to the relevant the TIA committee for consideration to provide remainder of the funding required. The TIA declined to further fund the project due to other funding obligations identified for 2020/21, particularly Covid-19 related endeavours. As a result of this decision, another funder willing to invest in radiopharmaceutical development has been sought.

The NTP Board approved the disbursement of the funding of MR9.1 (over two financial years) for the second work package of the project (WP2) in order for the project to proceed. The funding conditions as indicated previously remain applicable (royalty fee equivalent to 2.5% of revenue derived from the sale of the API by the NTP, exclusive manufacturing rights for the API, ownership of the IP emanating from this phase of the development should the project fail to proceed beyond WP2). The board of the NTP has also instructed the project team comprising of both NTP and NECSA members to simultaneously approach potential third party funders in order to secure the balance of funds, an estimated MR16 that is needed for the project. A list of funders was compiled and the different entities are being contacted to ascertain interest in the project. Initial discussions have commenced with PET Laboratorie. A Statement of Interest document (a simplified application at this stage) was prepared

and submitted in response to a TIA health sector funding call. Even though TIA has previously withdrawn their funding for the project, this new call could still be relevant therefore more information was requested from the TIA. The application was subsequently short-listed. The project has not yet been approved for the TIA funding. The Necsa team revised the initial calculations and submitted a request for the DMRE virement funding to cover the cost associated with facility readiness (including addressing the SAHPRA audit findings). In relation to the facility qualification, the Building Management System (BMS) requires an overhaul due to aging infrastructure, an outdated system (and software) and lack of availability of parts for maintenance and repairs. Approval was received for the funds required.

Terbium-161 PSMA (Medical Diagnostic and Therapy impact area project)

Lu-177 is becoming a very successful isotope for therapy and the NTP has recently opened their plant and is producing Lu-177 for the export market. However, there are contractual restrictions to supply this isotope to certain areas in the world. Tb-161 is an isotope that has very similar radiation characteristics and can also be produced in SAFARI-1. It has an additional benefit that it also emits an Auger which would allow the treatment of micro metastasis. Radiochemistry has been part of international network (led by Paul Scherer Institute (PSI) in Switzerland) that is advocating its use. Several high impact publications have appeared and continue to appear. All targets for the production are irradiated in SAFARI-1 and then sent to PSI, Switzerland for processing and formulation of Tb-161 radiopharmaceuticals such as Tb-161 DOTATATE. In this quarter, two targets of Tb-161 were shipped to PSI. As indicated, the Necsa was represented at the IAEA consultancy meeting on Tb-isotopes and the future thereof. This provided an excellent platform to gather information on the future role of the isotope. The Necsa and PSI continue to engage on producing the Tb-161 for a local Tb-161 PSMA clinical trial and a draft contract is still under discussion. The NTP is assisting in the contracting process.

A new theranostic for identifying and treating tumours

The molecular compound, GluCAB™ is a new theranostic and will initially be used to seek, identify, and treat solid mass tumours such as those found in breast and ovarian cancer. The term "theranostics" was coined to define an agent used for diagnosis via imaging followed by therapy and is fast becoming the norm in personalised medicine. The concept of passive targeting through the enhanced permeability and retention (EPR) effect has been demonstrated through micro-PET evaluation in xenografted mice where clear tumour uptake could be demonstrated.

A new chelator has been successfully incorporated in the molecule which will allow radiolabelling at room temperature and physiological pH which is a major improvement. Synthetic work for the current phase which involves the active targeting through a cleavable linker has been completed and confirmatory animal tests are planned in the next financial year. This phase is funded by the TIA seed fund but engagement with new funders is ongoing together with the co-owner of the technology, UCT.

Enabling technology platforms/clusters

Nuclear Medicine Research Infrastructure (NuMeRI)

The NuMeRI project was launched in April 2017 and incubated by the Necsa for its first three years. Execution of the Necsa incubation phase/contract for the NuMeRI was successfully completed by the Necsa and all the KPIs achieved. This is a major achievement for Necsa having delivered on a MR 149 infrastructure programme for the DSI. It proves the Necsa's capability to execute such large scale research projects. An independent legal entity (the NuMeRI NPC) was registered in February 2019 which has since taken over the NuMeRI project. Since 1 April 2020, the NuMeRI NPC, was contracted with the DSI for future funding. Full handover from the Necsa to the NPC took place in in the previous financial year. In the financial year under review, Necsa was subcontracted by the NPC to operate the pre-clinical imaging facility at Pelindaba on their behalf.

Preclinical Imaging Facility

The Necsa transformed a set of general laboratories at Pelindaba, licensed to perform radioactive work, into a dedicated NuMeRI interim facility for pre-clinical imaging research (the iPCIF).

An array of molecular imaging equipment to scan laboratory animals, together with the requisite ancillary apparatus, was installed and is fully functional. For the year 2021/22 the iPCIF has been involved in > 40 different studies including research and services, technical validation or measuring techniques, scout investigations during project consultation prior to the start of a physical study, collaboration, training and laboratory support – all performed beyond expectation (183%, 7.2D) by the iPCIF team. Laboratory space was constantly set up for various temporary services related to the particulars of each project. In addition, the mobile Biosafety Level 3 (BSL-3) laboratory has received governmental approval for operation of the relevant iPCIF project portfolio to extend into research focussing on infectious diseases. Services regarding animal handling and interventions are supervised and authorised by National Association for Laboratory Animal Science accredited personnel. The iPCIF updated its registered status at the South African Veterinary Council (SAVC) as a research facility. The PhD student hosted by the PCIF (Rc) successfully defended her PhD at UP and the degree was awarded in April 2022.

NuMeri

Nuclear Technologies in Medicine and Biosciences Initiative

The Nuclear Technologies in Medicine & Biosciences Initiative (NTeMBI), is a DSI programme which was transferred to the TIA in 2019 and is hosted and managed by the Necsa. The NTeMBI is in transition to a new cluster model that will deal with larger projects driven by principle investigators (PIs) and is matched between funders and researchers to achieve targeted outcomes. The cluster is foreseen as an overarching umbrella for all research in the area of Nuclear Medicine with the TIA as the funding vehicle. The Nuclear Medicine projects with the TIA were migrated from the Technology Innovation Cluster Programme (TICP) to the Health business unit within the TIA. No feedback from the TIA was received and it was since determined that a new Portfolio Manager has been appointed at the TIA. Contact will be made with her to re-start the engagements.

The Necsa-TIA agreement for the interim phase (which will facilitate the three projects as well as the administration thereof by the Necsa) is still in place. Two projects have been concluded successfully which resulted in five publications and three PhDs. The third project at Universitas Hospital in Bloemfontein on cervical cancer patients is behind schedule due to the COVID-19 situation whereby oncology patient recruitment is a low priority. In order to make efficient use of the radiopharmaceutical that will be flown from Gauteng, patients were to be pooled. This has now been determined to be impossible and lower patent numbers will unfortunately result but the study can now move forward.

The NTP's funding of research at academic hospitals has been channelled through the NTeMBI, which demonstrates industry funding. Disbursement of funds remains slow due to the fact that the projects require ethical approval and the convening of these committees has been low priority at academic hospitals due to Covid-19.

The Re/Tc project at University of KwaZulu-Natal (UKZN) was delayed as well although two visits took place in the reporting period the radiolabelling studies. Biodistribution studies and animal imaging are planned for later in 2022.

Recognition

Three visiting students who worked under the guidance of Dr MS Sonopo have finished their degrees.

- * Ms MS Malefo, MSc degree with distinction from UP
- * Mrs T Ramabulana, PhD degree from UP)
- * Ms N Mokwana, MTech from TUT, Radioanalysis worker

The IAEA has invited Dr Thomas Ebenhan, head of the PCIF, to assist with the planning of a "Technical Meeting on Radiolabelled Molecules for Diagnosis/ Therapy of Infection and Inflammation".

The joint publication by Necsa and PSI; Terbium-161 for PSMA-targeted radionuclide therapy of prostate cancer. European Journal of Nuclear Medicine and Molecular Imaging (EJNMMI): 46, 1919-1930 (2019). https://doi.org/10.1007/s00259-019-04345-0 was chosen as the best EJNMMI paper for 2020.

Professor Dr Zeevaart (representing Necsa) participated as mentor in the World Nuclear University virtual School on Radiation Technologies. He was also re-appointed as Extraordinary Professor at the North West University and University of Pretoria.

The expertise of Rc personnel is also highlighted by their invitation to review manuscripts submitted to international journals.

Members of Rc were invited by international universities to act as external examiners for MSc and PhD theses.

One member of Rc was registered as Natural Scientists with the South Africa Council for Natural Scientific Professionals (SACNASP).

6.3.4 OFFICE OF TECHNOLOGY TRANSFER (OTT)

The Office of Technology Transfer (OTT) Department resides in the Research and Technology Development (R&I) Division and is mandated in terms of the Intellectual Property Rights from Publicly Financed Research and Development Act (IPR Act, Act 51 of 2008) to facilitate the identification, protection and exploitation of intellectual property (IP) developed and owned by the Necsa. The Department provides a leadership role in innovation matters, which include technology licensing management, securing funding for further development based on sound business principles, and overall leadership of strategic projects with commercial potential across the Necsa's strategic impact areas.

Investment and commercial partnerships

Developments on some of the various technologies being exploited by the Necsa in partnership with other entities (including with a subsidiary) are outlined below.

OSCAR Reactor Modelling Code

The Necsa prides itself in having developed a state-of-the-art nuclear reactor modelling code called OSCAR a calculational system for nuclear reactor modelling, including specialised analyses and modelling services, method and code development. Through the OSCAR code, Necsa has established a strong local and international research reactor client base (client reactors include SAFARI-1 in South Africa, MNR in Canada, HOR, HFR and PALLAS in the Netherlands). It is realising passive licensing income and specialist modelling analysis services to OSCAR clients. The latest version of the code is OSCAR-5, which is an advanced multi-physics, high fidelity research reactor modelling system. To maximise value realisation from existing and potential clients, the Necsa is exploring a new possible consortium-based business model in which clients will be formal partners in development, in order to access a larger resource base and steer the development direction more closely to client needs.

GluCAB™ – a cancer theranostic drug

This technology has cancer diagnostic and therapeutic properties and is co-owned by the Necsa and the UCT. Both the Necsa and the UCT have a joint responsibility for securing the necessary funding to advance the technology to commercialisation. A TIA-seed funding of R400 000 was secured by the Necsa for technology development.

Mining Shroud Detection Technology

The Necsa has patented a novel process based on gamma-emitting sources to aid in the detection of broken mining shrouds, which, undetected or poorly detected, may result in long downtime and associated opportunity costs in open cast mining. This technology has a strong potential for application in the mining industry for detection of broken or missing shovel shrouds. A detailed market study funded by the Necsa's subsidiary, NTP Radioisotopes, was completed and has enabled firming up of the value case for the technology. Funding campaigns are in progress to secure the required funding for technology development.

Dislodged shrouds present a major operational problem to open pit mines as these shrouds, when undetected during mining operations, enter a crusher and cause irrevocable damage resulting in costly unplanned downtime. A market study revealed that, on average, mines loose up to MR183 per shroud induced damage of the crusher, this despite other warning technologies present.

The solution patented at the Necsa, deals with tagging these shrouds with a gamma emitting source and using gamma detectors to identify and locate these dislodged shrouds before they enter the crusher and cause damage. A gamma source does not require any external power and is not sensitive to heat, which gives this technology a competitive advantage over other methods. A demonstrator of the technology has been constructed and successfully presented to potential investors. The filed patent has protection in South Africa, USA, Russia, Argentina, China, ARIPO and is pending in Australia.

Wall Abrasion Monitoring

Hydro-cyclones are used in mines to separate larger ore aggregates from smaller ones, this is done before further milling and final processing. The wall of these hydro-cyclones is lined with ceramic tiles which help protect their walls from damage caused by the ore during spinning. However, these tiles erode due to the abrasive nature of the ore and once the ceramic lining is damaged, the hydro-cyclone suffers irrevocable damage.

The Applied Radiation Department developed a solution to address this problem faced by the mining industry. The technology consists of inserting a gamma-emitting wire source (Cobolt 60) into the ceramic lining of the hydrocyclones. By then employing the use of gamma detectors which monitor the radiation from the wire source, the erosion of the ceramic lining, which is linked to the length of the wire source, can be monitored. As the gamma radiation peak drops to a critical level a warning is signalled to the operator of mining processes. This solution will consistently monitor the gamma radiation emitted from the implanted wire and by extension the abrasion of the ceramic wall. The effect of monitoring the length of a radiation source in the presence of ceramic tiles has been done on a bench scale, and the focus is to develop a pilot for the relevant environment.

Cisplatin Diagnostic Companion

This cancer diagnostic technology is proposed to be used in conjunction with Cisplatin to unlock demand for Cisplatin chemotherapeutic (used in various cancer types). Part funding has been secured from the NTP Radioisotopes to carry out Phase I & IIa clinical trials, subject to co-funding being secured from other sources. A fundraising initiative is underway to plug the funding gap to carry out Phase I&IIa clinical trials.

Plasma Waste-to-Energy Technology

The Necsa has developed Plasma Waste gasification technology up to proof of concept, and through external funding, has built a 0.5 ton per day demonstration system on site, which has ignited interest from potential industry partners (Refer to the R&I section of this Annual Report for additional detail).

Plasma waste to energy

This technology can be demonstrated at different plant sizes for different feed materials, which include amongst others tyre waste, municipality solid waste, electronic waste and medical waste. Efforts are underway to secure further funding for technology development. Negotiations with the Limpopo Eco-industrial Park (LEIP) for the possible use of its Plasma Gasification technology to realise LEIP's zero solid waste objective are in advanced stages. This relationship is envisaged to unlock the necessary funding to develop the plasma technology for various types of waste generated in eco-industrial parks.

Ga-68-PSMA – a diagnostic drug for prostate cancer

Ga-68-PSMA is a diagnostic drug for prostate and breast cancer.

A partnership was secured between the Nuclear Medicine Department at Steve Biko Academic Hospital and the NTP. The Steve Biko Hospital expressed their intent to be the local off-taker for the product kit. Final stages works (including Good Manufacturing Practice in kit formulation) are in progress under funding from the NTP.

Neodymium Trifluoride (NdF_3)

As part of South Africa's minerals beneficiation objectives, the Necsa has developed a cost-effective and environmentally friendly process for converting neodymium oxide to neodymium fluoride, which is part of the Necsa's capability for conversion of metal oxides to metal fluorides. Neodynium fluoride is used mainly in the manufacture of permanent magnets for us in many commercial applications. The Necsa, in its efforts to support local small, medium and micro entreprises (SMMEs) and strengthen local manufacturing capabilities has availed its technology on Neodymium Trifluoride to Rare Earth Refinery (RER), an SMME that unlocked funding from the TIA in order to build a demonstration plant and produce a market sample. The OTT played a lead role in securing this partnership and the Necsa can look forward to realising some royalty payment if this technology becomes a commercial success. While this is a few milestones away, the Necsa is currently deriving value through its Hydrogen Fluoride (HF) supply to RER through its subsidiary, Pelchem in a mutually beneficial relationship.

Innovation Disclosures and Intellectual Property

Innovation Disclosures (IVDs)

The IP Management function of OTT records and reports the number of Innovation disclosures (IVDs) to the National Intellectual Property Organisation (NIPMO) on a biannual basis. The Necsa continues to reach their yearly IVD targets, with a total number of 7 IVDs for 2021/22 financial year. The IVDs are undergoing review and it is expected that the outcome will make meaningful contribution to the Necsa's IP portfolio.

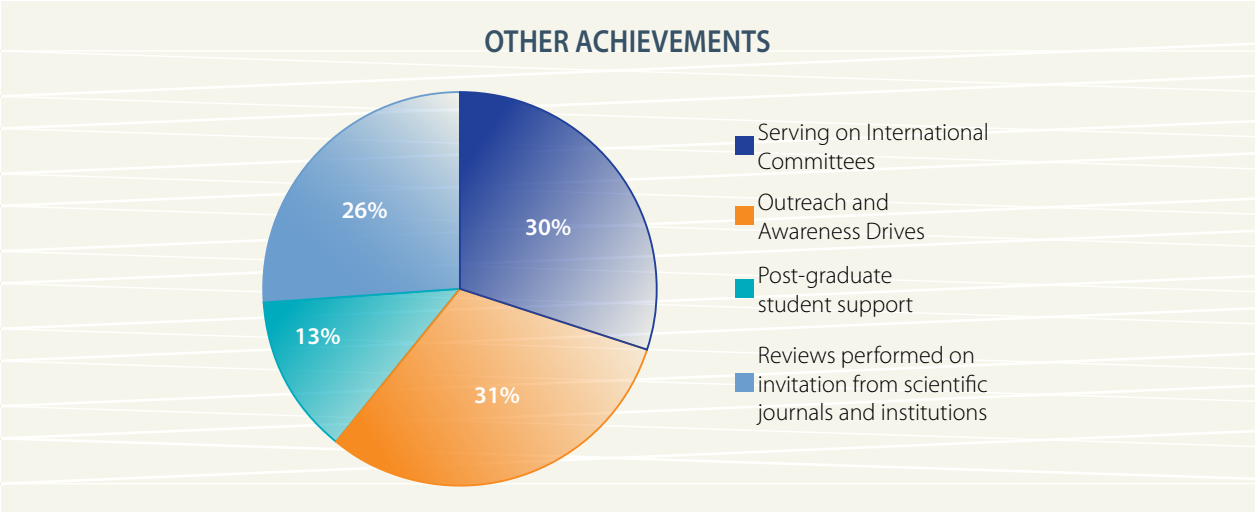
Necsa Laboratories

IP advocacy

Cultivating of innovation ecosystem is one of the OTT's functions by increasing IP awareness workshops and dialogue(s). The Necsa hosted a virtual webinar that took place on 5 October 2021. The speakers were Mr Pieter Visagie and Mr Thapelo Montong, patent attorneys from Adams & Adams, alongside Mr Trod Lehong who is the Director of Afriqinnov8. This event was dedicated at helping researchers to understand the basics of patent searching and how to conduct a Freedom to Operate Search (FTO). An overview of the different forms of IP protection and IP in the context of research contracts were also the topic of discussion. The event was a great success attracting individuals from different institutions.

IP management

The Glucab patent was granted in the China, Republic of Korea, Mexico and South Africa (Inventors: Dr Cathryn Driver and Prof Jan Rijn Zeevaart). The Mining Shroud detection patent (Inventor: Hills Andries and Adendorff Jacobus) has been allowed to grant in Japan and granted in Argentina, Russia and China. The "Mo-99 via the gamma, n reaction" (Inventor: Prof Jan Rijn Zeevaart) was granted in Algeria and South Africa. These activities have since been reported to NIPMO in a more comprehensive manner.



6.4 NUCLEAR OPERATIONS & ADVANCED MANUFACTURING

6.4.1 SAFARI-1

The SAFARI -1 research reactor is one of the Necsa's strategic nuclear facilities. Its main application is the commercial production of radioisotopes and the rendering of irradiation services. SAFARI -1 provides the basis for the Necsa's radioisotope business through its subsidiary, the NTP Radioisotopes SOC Ltd and other commercial products, as well as the neutron transmutation doping of silicon. Neutron beamlines and other irradiation positions are also used by the Research and Technology Development Unit for research and training, neutron diffraction, and neutron activation analysis facilities.

The SAFARI -1 research reactor performed excellently throughout the financial year under report (2021/22). It also managed well with a shortage of resources to succeed under the Covid-19 pandemic challenges. The facility continues to support the stakeholders and in particular the radioisotope production facilities. SAFARI-1 has maintained with its record of safe and efficient service to users and public since its first criticality in March 1965.

Operational schedule

The reactor operational availability was **293.76** days against the target of **287 days**, which represents an operational availability utilisation level of **102.36%** of planned operation during 2021/22 at an average reactor power of 20.17 MW. The accumulated Megawatt Hours for SAFARI-1 operational lifetime

until the end of March 2022 is 4 510 507 MWh since its first operation in 1965.

The reactor engineering support related to operational safety, core and fuel management has proceeded flawlessly and also achieved a good fuel economy and utilisation result. The IAEA Safeguards Inspections and the Physical Inventory Verification inspection that took place did report no abnormalities and showed satisfactory results. The reactor operational safety was maintained during the full operational cycle within the safe operational technical specification limits during this year.

The SAFARI-1 Plant Health Assessment which will also support the justification for the continuous safe operation of SAFARI-1 operations beyond 2030 did progress well, where Phase 1 (reactor vessel assessment) and Phase 2 (biological shield concrete assessment) are completed and submitted to the NNR. For Phase 3 of the assessment - which includes the related Safety related items for categories 1, 2, and 3 Structures, Systems, and Components (SSCs). Seven assessment reports for the various SSC system break down categories were internally reviewed at SAFARI-1, and will be finalised within the second quarter of the 2022/23 financial year and submitted to the NNR for information. These assessment reports provide valuable information that can be used to infer a reasonable estimate of the remaining service life of the reactor's main safety important SSCs to ensure continuous safe operation.

The SAFARI-1 storage pool capacity limitation creates a high risk for continuous operation. SAFARI-1 issued a contingency plan, that guarantee additional storage space up to end of December 2025.

SAFARI-1 Fuel and Control Rod Assembly

SAFARI-1 requires fuel and control rod assemblies in order to meet the required operational days per year. Therefore it needs a well planned security of supply programme to ensure fuel and Mo target plates are available for SAFARI-1 operational and commercial sustainability. The fuel fabrication facility of the Necsa manufactured the required aluminium components in order to assemble and supply the required SAFARI-1 fuel assemblies.

SAFARI-1 OPERATIONAL PERFORMANCE

Reactor maintenance and refurbishment

The ageing management programme progressed well in some areas.

All routine operational maintenance programme task requirements were completed as scheduled, which is critical for the safe and reliable operation of the reactor. The maintenance programme and continuous execution thereof are at a -100% task completion which contribute to the excellent performance over the last 20 years for the safe operation of SAFARI-1.

Technical collaboration

Several technical collaboration meetings, in a virtual meeting format, were held due to the Covid-19 restriction on travel during the 2021/2022 financial year between SAFARI -1 (South Africa), HFR & Pallas (NRG - Petten, The Netherlands), and the OPAL reactor (ANSTO, Australia), where valuable information was shared on topics related to reactor operations, engineering, and SHEQ. Fruitful discussions were made on operational and maintenance events and incidents that contribute to the continuous safe operation of the reactor, also to ensure alignment with the changes and trends in new international standards.

Furthermore, the assistance provided between the four reactor groups related to operational and safety matters during the previous financial year. This includes sharing of information that benefits the newly-planned MPR for South Africa. Also, involved plant assessment methodology performed at HFR Petten reactor; sharing of the latest results of the HFR vessel material irradiation assessment for benchmarking purposes by SAFARI-1. The latter significantly contributed in justification and update of the SAFARI-1 vessel neutron fluence limit for continuous safe operation beyond 2030 until the new MPR is commissioned.

Quality safety security and environmental management

The SAFARI-1 research reactor successfully maintained the integrated management system to comply with the standard for ISO 9001: 2015 and other IAEA related standards. The SAFARI-1 safety indicators showed a total injury and disabling

injury incidence rate of zero for a third year which has so far been maintained for more than 893 521 man-hours. The SAFARI-1 Safety Culture Programme assessment showed a good safety culture among SAFARI-1 employees.

SAFARI-1 security system complies with the international standard INFCIRC/225 Revision 5 for Physical Protection of Nuclear Material and Nuclear Facilities.

6.4.2 MULTI-PURPOSE RESEARCH REACTOR PROJECT (MPR)

Background on the MPR Project

The SAFARI-1 Research Reactor has played a pivotal role in the development of South Africa research over the past 57 years. SAFARI-1, situated on the Pelindaba site of the Necsa, is a 20 MW (thermal) multi-purpose tank-in-pool reactor that achieved first criticality on 18 March 1965.

The research reactor is the heart of Necsa and ensures over 1 800 gainful direct jobs, as well as being an invaluable tool for research and development geared towards socio-economic development. It has brought in valuable foreign exchange with sales of over R1billion per annum to international markets. SAFARI-1 also ranks as most utilised operating reactor in the world (out of over 240). It has positioned South Africa as a leading global player in the field of research reactors. Currently, SAFARI-1 is virtually fully utilised for the production of Molybdenum-99 and other isotopes. Molybdenum-99 is the raw material used to produce Technecium-99m, a key medical isotope used in excess of 40 million nuclear medical procedures globally per annum.

SAFARI-1 is reaching the end of its operational and competitive lifetime and its ability to operate and continue global competitiveness beyond 2030 is a major risk to the sustainability of Necsa and for the growth of sales, research, development and innovation, and the related socio-economic benefits. Most of its competitors have already been decommissioned and replaced, or plans to do so in the next decade are at an advanced stage. In addition, many new research reactors with enhanced capabilities for production are in planning or construction globally.

The Necsa has demonstrated its ability to generate profits from sales of radioisotopes from SAFARI-1 research reactor, which is one in 5 of over 240 research reactors that achieved this. Research reactors are predominantly meant to provide research, development and innovation tools for a country to advance its industry and economic competitiveness. The new replacement reactor project will double the volume of radioisotope capability of South Africa, as well as increase the capacity for scientific and industrial research from neutron scattering instruments by more than a factor of five.

The retention and growth of over 1800 jobs at the Necsa is dependent on this new MPR and the cost of not making the investment essentially means the end of the sustainability of the Necsa. The dependence to maintain the infrastructure at the Necsa will become a burden on the fiscus. This will eventually lead to a downward spiral in terms of loss of scientific and industrial research and innovation. Furthermore, this will cost orders of magnitude more to develop again once lost. Nuclear research and development is playing an ever increasing role in the development of new industries globally and South Africa, as the envy of the world in this space, will find itself on the other end of the spectrum of scientific prowess.

BENEFITS ASSOCIATED WITH MPR PROJECT

Services for engineering, science and technology research, development and innovation

The Necsa is a centre of South African nuclear science and technology as mandated by the Nuclear Energy Policy. There is a steadily growing community of South African researchers from various universities and within the Necsa that regularly use irradiation services and neutron scattering instruments, either at limited SAFARI-1 nuclear research reactor facility or facilities abroad. Access to international facilities is vastly oversubscribed as they are extensively used in materials research.

The MPR will be employed for the following purposes:

a) In-core:

- Irradiation of target materials to produce medical and industrial radioisotopes.
- Irradiation of silicon ingots to produce the basic material for the manufacturing of semiconductor devices.

- Irradiation of material samples for neutron activation analyses.
- Irradiation of material samples for material damage studies.
- Irradiation of target materials for researches.

Ex-core:

- Material science research using neutron beams and a suite of associated experimental equipment.

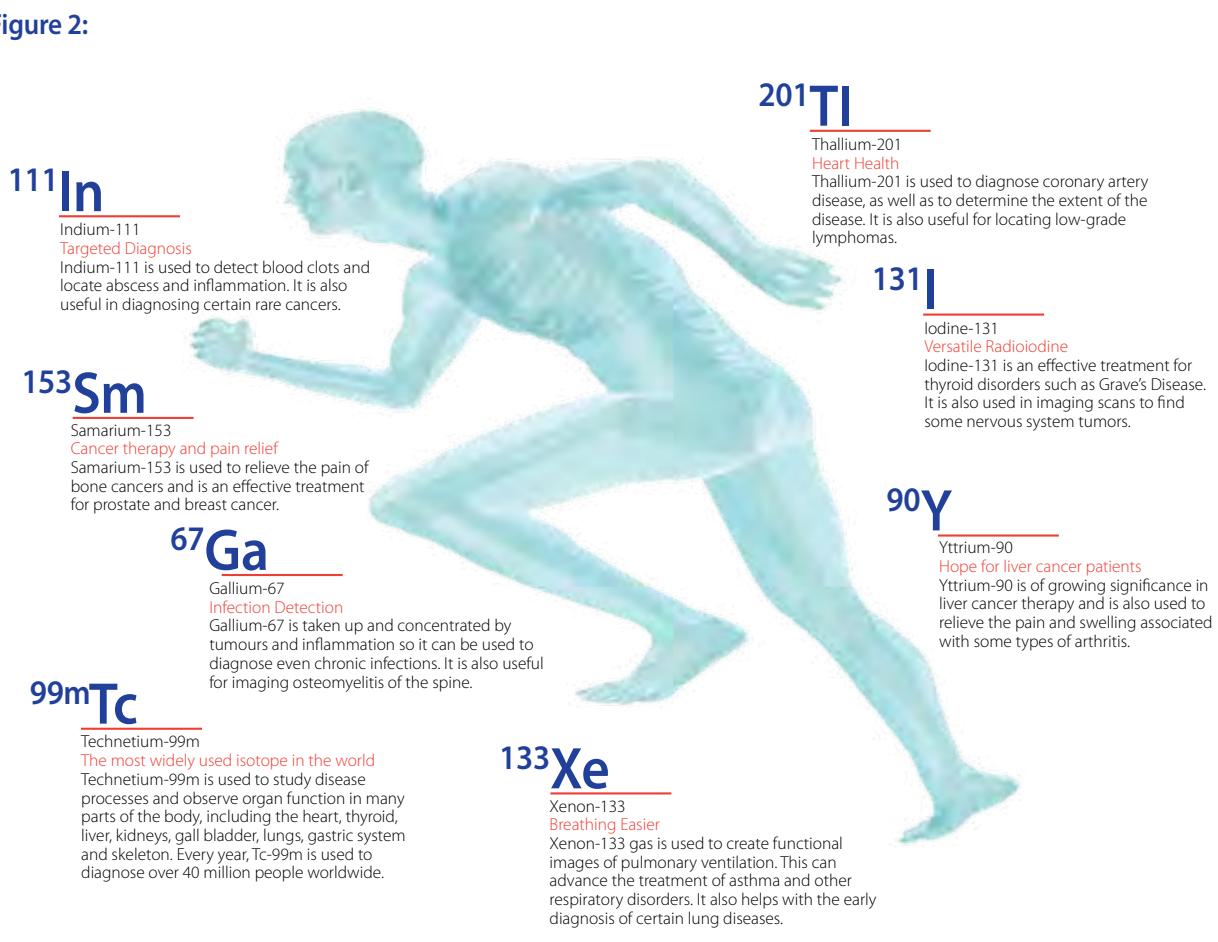
Production of radioisotopes

Radioisotopes are varieties of the same chemical element that have an unstable nucleus, which decays emitting alpha, beta and gamma rays.

Radioisotopes are created by placing target materials inside the nuclear reactor. Currently, this is the only proven way to reliably produce bulk quantities of medical-grade radioisotopes. After irradiation the targets are stored in the reactor pool for a cool-down period, and are then transferred in specially designated casks to the existing Necsa facilities for chemical processing. Of the 40 million medical procedures with medical and industrial radioisotopes being carried out in the world each year, approximately 10 million of these radioisotopes are produced by South Africa's SAFARI-1 reactor. This number will double in the new MPR. The demand for nuclear medicine is growing due to its ability to diagnose and treat cancer, heart disease and other illnesses. Notwithstanding its excellent safety record and being proven as one of the world's most reliable reactors for the production of medical and industrial isotopes, this facility is ageing and its replacement is a priority.

Figure 2: Nuclear Medicine: Nuclear medicine is used for diagnostic purposes and the therapeutic treatment of cancer to treat more than 40 million people per annum.

Figure 2:



Hot cell handling and post-irradiation examination facilities

Figure 3: Example of hot cells at a research reactor facility

Material irradiated in the reactor is transported to post-irradiation handling facilities located at the reactor service pool for examination. Hot cell handling and post-irradiation examination facilities are constructed to provide radiation shielding to the operator when handling the irradiated material. The operator is positioned outside the hot cell and uses tele-manipulators to remotely handle equipment inside the hot cell. Work in the pool-side hot cells includes unpacking irradiated material from the containers that housed it during irradiation, and to re-packing the material into transportable containers.

Additional hot cell handling and post-irradiation examination facilities are used as dedicated post-irradiation examination for material testing purposes. In the post-irradiation examination hot cells the samples are visually inspected and subjected to various tests and analysis.

The tests include impact testing, tensile tests, fatigue tests, fracture toughness tests, metallographic studies, hardness tests and irradiation damage evaluation. These hot cells will be equipped with lathes, drilling machines and other machine tools for cutting and shaping samples for use in the various testing equipment mentioned.

South African pharmaceutical industry and nuclear medicine

The demand for pharmaceutical products in South Africa is increasing. The country has an established supply chain, with local production meeting almost 70% of the pharmaceutical sector's demand. The bulk of local pharmaceutical outputs comprising generic medicines, representing 50% of the overall market. The South African pharmaceutical market was forecasted to grow around 7% a year and reach R54 billion in value by 2021. Pharmaceutical companies will increasingly benefit from a centralised procurement database. South Africa is the only country in Africa that meets World Health Organization (WHO) standards to manufacture pharmaceutical products. State support for localisation will underpin domestic manufacture.

The NuMeRI, an initiative partly funded by the Department of Science and Technology (DST), now the DSI, and led by the NECSA, is a medical imaging facility dedicated to drug development and clinical research. It provides a framework to consolidate expertise and implement new strategic initiatives relating to research and development in NTeMBI. The completed infrastructure will be a distributed network comprising of the Intensity Modulated Neutron Therapy (IMNT) centre at iThemba LABS in Cape Town, the PET Centre for Infection Imaging at Tygerberg Hospital in Cape Town, and the main NuMeRI facility to be established at Steve Biko Academic Hospital. The Necsa, through its subsidiary NTP, supplies a variety of radioisotopes and tracers, the key ingredient for the studies performed at a facility of this nature. These are currently produced using SAFARI-1 which will soon be replaced by the MPR.

The NuMeRI will be a sought-after destination for pre-clinical and clinical screening of new drug entities that can be performed under one roof giving drug developers (local and international) a one-stop shop service. It will create a viable pipeline of radiopharmaceutical compounds that will be exploited on the world market. Drug development will not be limited to radiopharmaceuticals (diagnostic and therapeutic) but of equal importance will be the evaluation of conventional drug candidates such as new antibiotics, tuberculosis (TB) or oncology drugs.

Material testing for industry

Neutrons are categorised by their energy, expressed in units of electron volts (eV). For example, fast neutrons: more than 1 million eV, thermal neutrons: around 2.2 eV and cold neutrons: less than 0.02 eV.

A number of the in-core irradiation positions at the MPR will be reserved for material testing. This type of material testing is typically performed to determine the impact that a radiation enviroment has on the materials used in a nuclear power reactor. A small material sample is inserted in the research reactor core and exposed to very high intensity radiation over a short period. This enables scientists and engineers to predict the behaviour of power reactor internal structures over the lifetime of the reactor. Another application of radiation damage involves the study of the impact of cosmic radiation on sensitive instrumentation used in the aeronautical and space (satellite) industry.

Depending on the nature of the test, the samples may be placed inside the core in a location where high flux of fast neutrons is present to study the neutron damage to material and fuel testing. Where the tests require irradiation by thermal neutrons, the in-core Molybdenum-99 target positions may be used interchangably. Test samples are inserted into the designated core positions with special rigs. The volume of a container within which test samples are placed is typically in the order of 400 mm tall with a diameter of approximately 60 mm. After irradiation the samples are removed and transported in dedicated under-water channels to post-irradiation examination facilities within the MPR facility.

Neutron activation analysis for mining and other industries

Neutron activation analysis is a process used to determine the concentrations of elements in materials. In this analysis, sample sizes as small as 50 mg can be used. At the SAFARI-1 reactor small samples of elephant tusk and rhino horn were irradiated for the South African Police Service to determine, from their relative mineral content, which part of the country they were poached from. This technique is also used for analysing works of art and historical artefacts and for research.

The sample specimen is placed inside a canister and irradiated in the reactor core, where it is bombarded with thermal neutrons, creating radioisotopes of the elements present in the sample. After a short irradiation in the core, the samples are sent to existing facilities at the Pelindaba site for analysis. The radioisotopes created in the irradiation process decay via the emission of gamma rays. These gamma rays are characteristic of the element from which they were emitted, thereby enabling scientists to very accurately characterise the material being studied.

Irradiation of silicon ingots for electronics industries

Figure 4: The ingot diameter varies from 128 mm to 152 mm, with a length of 600 mm.

Silicon ingots

Semi-conductors are key components in modern electronics. When pure silicon is irradiated, some silicon atoms change to phosphorus atoms; thus creating a semi-conductor for use in high quality electronic devices, including cellphones and computers. This irradiation process, referred to as Neutron Transmutation Doping (NTD), involves the placement of silicon ingots inside an aluminium canister, near the core of the nuclear reactor where doping occurs. The irradiated product is decontaminated and shipped to the client. NTD is superior to other available technologies to produce the highest quality semi-conducters with a very homogeneous distribution of phosphorous atoms in the silicon crystal. This controlled process achieves superior conductivity performance in electronic devices and is widely used by the semi-conductor manufacturing industry.

Neutron beams and associated instruments

Neutrons produced in the reactor core are channelled into neutron guides attached to the portals in the reflector vessel, forming beams which are directed to the neutron beam instruments. Material samples at the instruments scatter the neutrons onto a detector, and the resulting patterns are then interpreted by researchers. The majority of the material samples are laboratory size samples, ranging from 1 cubic millimetre (the size of a pin head) to 1 cubic centimetre. The material samples analysed in the strain scanning instruments are larger, such as a section of a railway track or part of a power station turbine blade.

The MPR is to be equipped with thermal and cold neutron guides. Thermal neutrons are used to look inside metallic objects such as aircraft and engine components, and to investigate the magnetic and atomic structure of materials such as pharmaceuticals, minerals and superconductors.

Cold neutrons are generated by slowing down thermal neutrons with a device referred to as a cold neutron source. The cold neutron source operates at temperatures in the region of -250 °C near the reactor core, from where the low energy neutrons are transported through neutron beam guides to the beam hall.

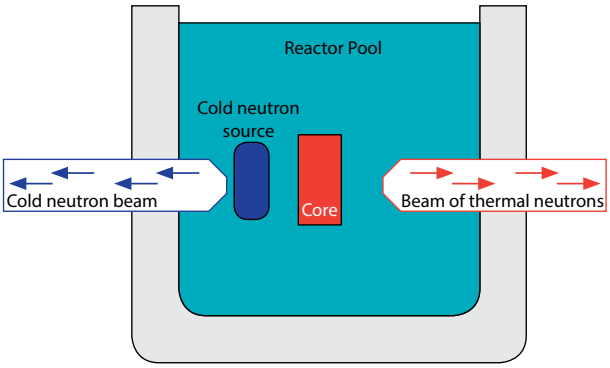


Figure 5: Cold Neutron Source Position Illustration

The beam hall, to be located adjacent to the reactor building, houses instruments and detection equipment. Neutron guides begin within 1 meter from the reactor core and continue through beam shutters until the outer perimeter of the reactor, and from there as far as 40 metres (or more) to the various neutron beam instruments.

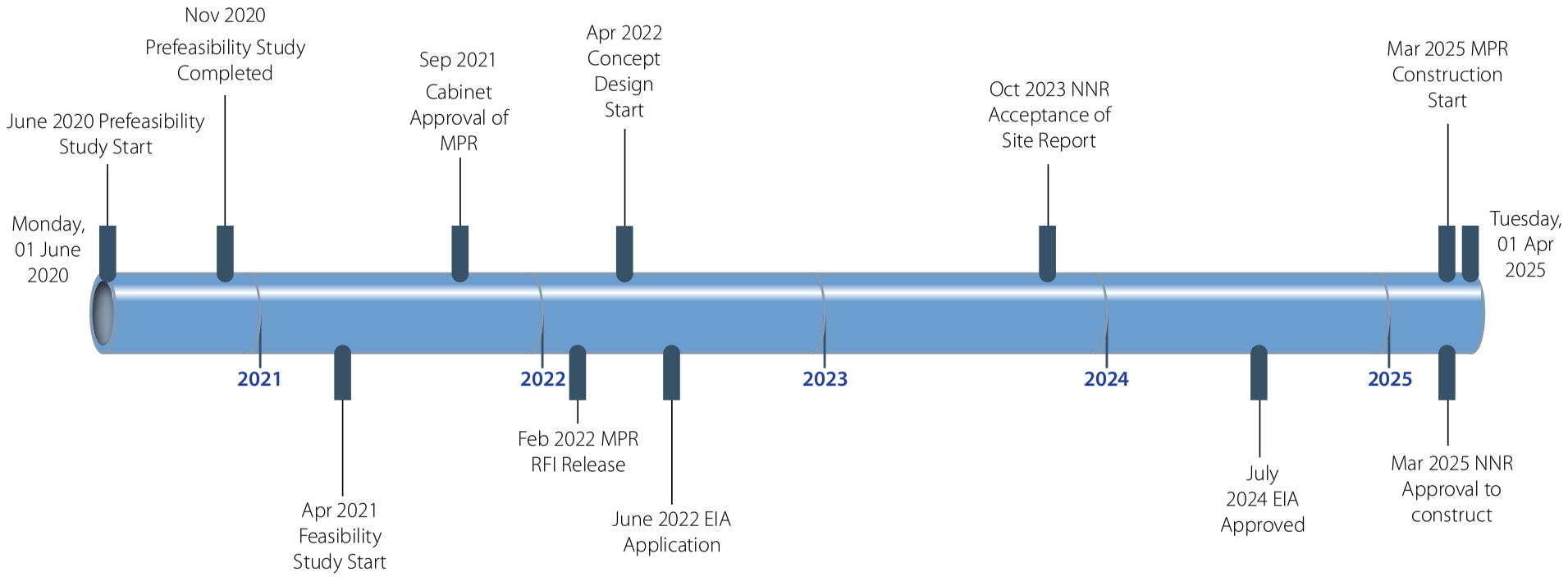
These neutron guides are 5 cm wide and between 5 cm and 30 cm high (the length of a ruler), and operate under vacuum. Beam lines are equipped with super mirrors which bend and focus neutron beams onto the materials being sampled.

Cold neutrons allow researchers to study the structure and properties of plastics, ceramics, magnetic materials, pores in rocks and biological materials. Besides providing these highly sophisticated services to industry, this facility will also support South African universities to produce world-class doctorals and post-doctoral scientists and engineers in related fields of study using South African-based technology instead of applying for the use of international research reactor instruments.

PROJECT EXPECTED TIMELINES WITH KEY MILESTORES BEFORE CONSTRUCTION

Figure 6 below outlines the anticipated timelines for the project up to the approval for construction, currently planned to start in March 2025. These timelines are subject to change depending on the necessary regulatory approvals.

Figure 6: Timelines for the MPR Project



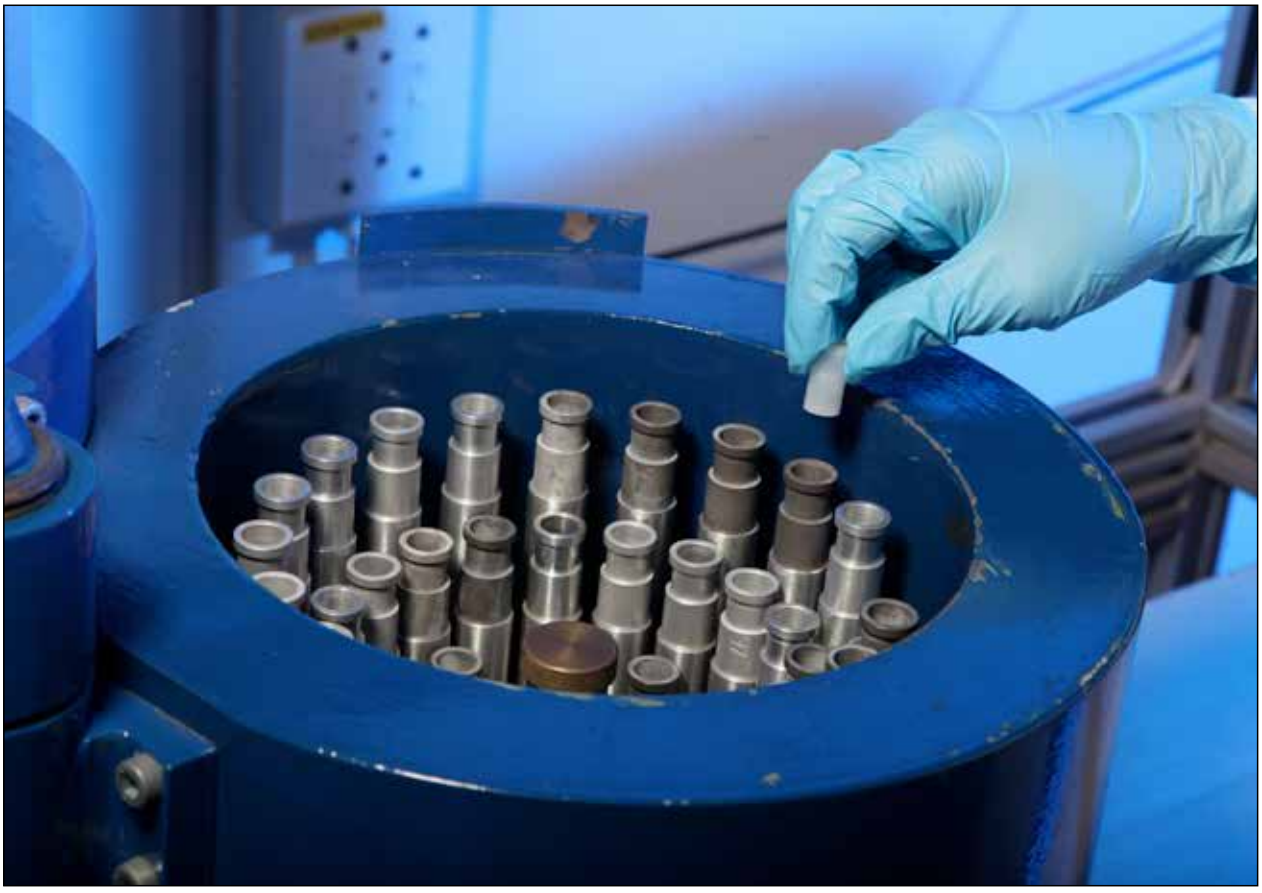
6.4.3 ANALYTICAL AND CALIBRATION SERVICES (ACS)

Analytical and Calibration Services (ACS) operates the Necsa's laboratories providing analytical, calibration, nuclear forensics and radiation protection consultancy services to internal and external customers. ACS' main function is to provide third party quality assurance with respect to products and services produced for markets of interest as well as verification of compliance to regulatory requirements on behalf of its customers. ACS is running four state of the art laboratories namely (1) Radio-Analysis Laboratries (RA), (2) Pelindaba Analytical Lab Laboratries (PAL), (3) Calibration Laboratories (CAL) and (4) Nuclear Forensics Laboratories (NFL) using proven technologies and experienced scientist and technicians. The Marketing and Development Support (MDS) group is responsible for new services and products development, customer relations and support the laboratories with expansion of scope of existing services, quality and safety management projects.

The markets serviced includes agriculture and food testing services, water and environment analyses services, nuclear forensics analyses services, material and product testing services, calibration and metrology services.

The majority of samples submitted to ACS laboratories are for testing of:

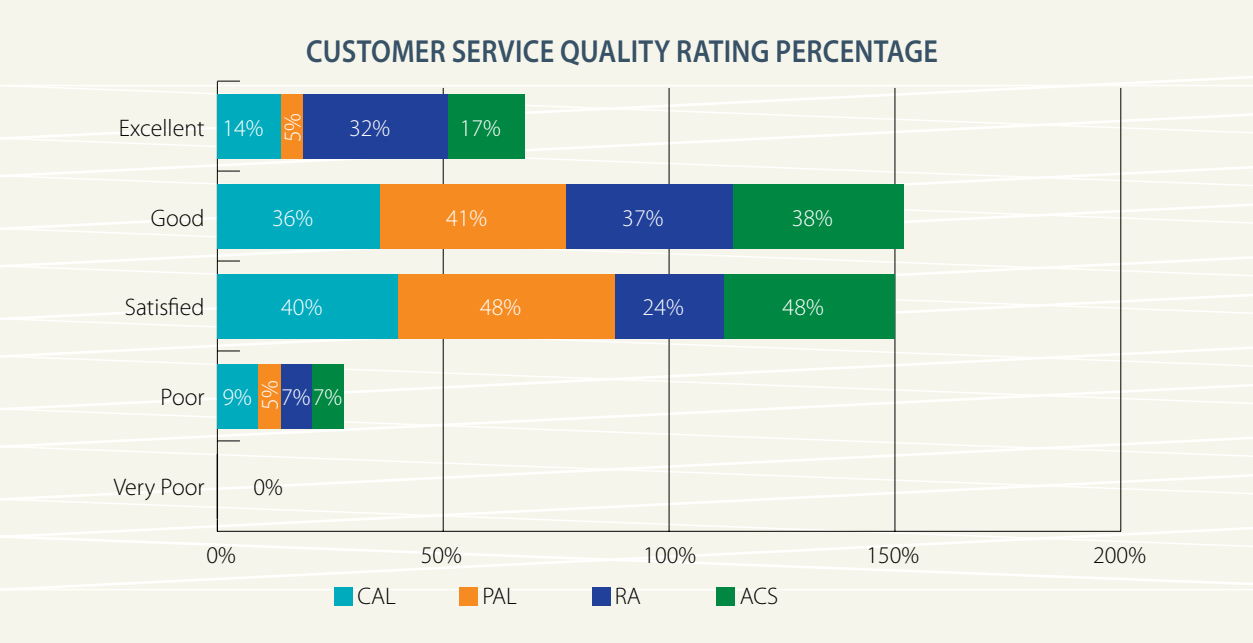
- Drinking water samples to establish fitness for human consumption.
- Environmental samples (including waste waters) to establish compliance to applicable regulatory requirements.
- Occupational samples to ascertain that there is no uranium in urine.
- Food and beverages samples to detect potential presents of contaminants of interest such as heavy metals.and
- Raw materials and finished products against specifications which may include analysis of moisture content and purity of the material, etc.



Necsa Laboratories samples

Customer satisfaction

ACS successfully completed the online customer satisfaction survey during the year under review. Customers with registered active accounts participated in the survey and rated the quality of our laboratory services from very poor to excellent (see Chart 1): Customer Service Quilty Rating Percentage. On average 7% rated quality of our services as poor with majority indicating either as satisfied or good or excellent. Majority of concerns raised by customers related to "turnaround time" and "feedback on progress of processing their samples". An action plan has been developed in this regard to respond to customer's burning questions.



Quality accreditations

Three out of four laboratories (i.e. RA, CAL & PAL) are SANAS-accredited in terms of ISO/IEC 17025 requirements and a process to accredit the remaining laboratory (NFP) is under way. PAL is accredited for trace elements and physicochemical parameters in a wide variety of matrix samples including but not limited to drinking, boreholes, environmental and sewage effluent water as well as gases. RA is accredited for the wide range of radio-analytical methods in current use with the exception of methods for neutron activation and actinides analysis.

The list of specific accredited methods can be viewed on the SANAS website directory of accredited laboratories (testing laboratory numbers: T0111, T0168 and calibration laboratory number: 1203). Annual internal audits were conducted for the three laboratories, i.e. PAL, RA, CAL and NFP using the services of an external consultant. The main purpose of these internal audits was to verify level of compliance of the laboratory against the newly-promulgated version of the ISO/IEC 17025: 2017 standard. The outcome of the internal audit indicated that all the three laboratries are meeting more than 80% of the prescribed requirements. One laboratory which could not be assessed in 2021 financial year will complete the audit in the 2022 financial year.

Proficiency tests

The laboratories participated in various annual international and national proficiency test schemes as part of the requirement to retain SANAS accreditation (see Table 10). Of the 13 test schemes participated on, only one fell below the target of 80%. On average, performance of our laboratories improved significantly in proficiency test schemes from 77% in the last financial year to 91% during the reporting period. This improvement can be attributed to a lot of training and re-training that was implemented for the past two years.

Table 14: Proficiency test scheme % compliance of results				
Laboratory	**Proficiency scheme**	**2021/22**	**2020/21**	**Status**
Radio-Analysis Laboratories	CTBTO proficiency test exercise	80%	None	↑
	IAEA-ALMERA proficiency test on the determination of radionuclides	90%	68%	↑
	US Department of Energy's IARMA	92%	100%	↓
	PROCORAD Radio-toxicological inter-comparison 2020	71%	56%	↑
	MAPEP proficiency test on the determination of radionuclides	84%	88%	↓
	Ad-hoc proficiency test on the determination of radionuclides	100%	None	↑
Pelindaba Analytical Laboratories	SABS Group 1 analysis of heavy metals in water (including uranium)	91%	86%	↑
	SABS Group 2 analysis of nutrients in water	88%	67%	↑
	SABS Group 3 analysis of major constituents in water	100%	80%	↑
	LGC Analysis for free chlorine in water samples	100%		↑
	Thandela analysis for nitrites, phenols and trihalomethanes in water	100%		↑
Nuclear Forensics Laboratory	SABS Group 1: Uranium analysis and heavy metals in water	91%	72%	↑
Calibration Laboratories		100%		↑
Average performance		91%	77%	

Key-metrics

Growth rate

Laboratory services experienced significant growth in the number of customers serviced during the reporting period in that 47% growth rate was achieved compared to the previous financial year. All sectors (without exception) registered positive growth rate with mining and manufacturing dominating. Moving forward, a lot of marketing effort will be placed on the food and agricultural sector as this sector has displayed consistency in utilising our laboratory services even last financial year when other sectors performed poorly.

Table 15: Organic growth (number of customers per sector)							
#	**Industry sector**	**Quarter one**	**Quarter two**	**Quarter three**	**Quarter four**	**2021-22 financial year**	**2020-21 financial year**
1	Mining & Minerals Processing	42	58	63	53	202	98
2	Manufacturing	41	60	61	70	211	52
3	Government	12	12	9	10	43	34
4	Health Care	6	10	11	10	34	14
5	Agriculture	15	36	37	35	123	117
6	Consulting	19	14	15	18	60	56
7	Transport	1	1	2	3	5	0
8	Other I laboratories	8	6	10	20	37	22
9	Educational institutions	2	6	7	3	18	3
10	Energy sector	3	4	3	3	13	0
TOTAL		**154**	**206**	**218**	**225**	**748**	**396**

Productivity (number of samples processed)

The laboratory productivity missed target sales for the financial year by 2% compared to the short fall of 48% registered in the previous financial year. Quarter one produced the best results whereas quarter four was the worst performing. Laboratories validated and developed more test methods during the reporting period. This process is meant to improve the efficiency of the laboratory processes and also to open up new sales pipelines. In the 2022/23 financial year, most of these methods will be commercialised to improve revenue.

Table 16: Productivity outlook

#	KPI/measure	Quarter one	Quarter two	Quarter three	Quarter four	2021-22 financial year	2020-21 financial year
1.2	Plan	13953	13 953	13 953	13 953	55 812	48 160
1.3	Actual	15 400	13 340	13 967	11 735	54 442	25 076
1.4	Variance	1 447	-613	14	-2 218	-1 370	-23 084
1.5	% difference	10%	-4%	0%	-16%	-2%	-48%
Laboratory test methods validated and developed							
2.1	Planned	49	35	29	9	122	50
2.2	Actual	23	42	36	5	106	29
2.3	Variance	-26	7	7	-4	-16	-21

6.4.4 ADVANCED MANUFACTURING

The Advanced Manufacturing epartment specialises in engineering and manufacturing of nuclear and commercial products. It has the capabilities and expertise to put together project teams of specialists within the Necsa, ensuring projects are integrated across the various engineering, scientific and fabrication disciplines within the corporation.

Table 17: Advanced manufacturing is reporting on the Pelidaba Enterprises Key Performance Indicators

KPA	KPI	FY22 Target	YTD Actual	Q4 Target	Q4 Actual	Q4 Reasons
Nuclear and Industrial Manufacturing	Pelindaba Enterprises revenue	**R36.5m**	**R65.5m**	**R4.4m**	**R11.8m**	Additional task orders for R32m were received and invoiced including a portion of the SEC Piping Installation Project.
	Net profit	**(R10.2m)**	**(R35.2m)**	**(R13.6m)**	**R(47.9m)**	Overspending as a result of provisions for bad debts and cost of sales.

The Advanced Manufacturing department is an ISO 9001:2015 certified organisation that is also as an American Society for Mechanical Engineers (ASME) III supplier of Nuclear Manufacturing. The ASME III certification gives Nuclear Manufacturing the capability to design, fabricate, and assemble nuclear components which includes, but is not limited to, vessels, piping, supports, and tanks. The Advanced Manufacturing Department is also certified as an ASME VIII supplier of Commercial Manufacturing for coded non-nuclear grade work. Other certifications include the ISO 3834 for welding and ISO 9001 for general industrial products.

Turbine Condensate Tank

It also has made localisation inroads in getting involved in the life extension projects at the Eskom Koeberg Nucler Power Plant with a number of nuclear related projects and is becoming an important local supplier of that specialised work. The main highlights on projects managed are as listed below:

External projects

Eskom Koeberg extension of the operational life projects:

- SEC piping manufacturing and installation. Completed installation of Unit 2 Train A and dismantling of the SEC piping completed.
- Multi-orifice packs manufacturing. Delivered to Eskom Koeberg.
- Release and dismantle the two old PTR Tanks. Eskom has accepted execution file and site establishment has been initiated.

SEC Piping System completed for installation during Eskom Koeberg Outage

Multi-orifice Packs completed for installation during Eskom Koeberg Outage

PSR Project for Eskom Koeberg Safety Case:

- PSR Project Koeberg is required by the NNR to perform their third ten-yearly periodic safety review (PSR/SRA-III) hence they approached Advanced Manufacturing to develop and use the SRA-III report and outcomes thereof as an input into the integrated safety case to justify long-term operation beyond 2024. Pelindaba Enterprises has completed the execution of the project utilising a mix of local and international based resources.

Studies required for Eskom Koeberg extension of the operational life:

- Numerous studies were made on Waste Management Plan, Characterisation Study and Site Work, Characterisation Source Term Calculation, Chemical Characterisation and Shielding Studies for Transient Storage at Koeberg.

External commercial projects included:

- TOMCO for the design and manufacture of heat exchangers in a accordance to ASME VIII and SANS 347 category which is in the final design stage.
- SCAW METALS for the design, manufacture and installation of a pre-filter system which was successfully delivered, installed and commissioned.
- RIO TINTO for the manufacture of filter panels which were successfully delivered.

Internal Necsa projects

The Necsa's Decontamination and Decommissioning (D&D) Projects:

- The D&D Programme is made up of many projects including amongst others Area 27 Cylinder De-Heeling, Decommissioning of J-Building, Decommissioning of XB Building, Decommissioning of Actinide Laboratory, Decommissioning of P-2800 and Decommissioning of Room 176 in P-1500 and Decommissioning of Room 176 in P1500.
- Characterisation procedure was completed.

Thabana pipe store extension:

Board members visiting Thabana Store

- The EIA final scoping report has been submitted to the Department of Forestry,
- The NNR has accepted the Basic Design Report.

6.4.5 NUCLEAR WASTE AND LIABILITIES MANAGEMENT (NWLM)

Nuclear Liabilities Management (NLM)

NLM has been established to discharge nuclear liabilities of past strategic nuclear facilities. The D&D programme involves the dismantling, decontamination, and decommissioning of the related nuclear facilities, the management of all historical nuclear waste as well as waste generated during the decommissioning of these facilities. The D&D work carried out by Necsa has from 2000, been funded through the Necsa budget appropriation as well as a special Ministerial allocation (ring-fenced funding) in line with the 2004 Nuclear Liabilities Management (NLM) Plan.

Cabinet approved the 2004 NLM Plan and divided the total nuclear liabilities (nuclear and related chemical facilities) into three major stages. The approved funding was for nuclear liabilities of past disused strategic nuclear facilities, as a ring-fenced allocation to the Necsa.

The 2021 Policy Procedure on Management of Nuclear Liabilities Arising from Past Strategic Nuclear Facilities "requires the Necsa to submit an "Annual Plan of Action" for a particular year and to report retrospectively, on an annual basis, on progress made with the execution of the "Annual Plan of Action", to ensure oversight and accountability. The Annual Plan of Action for the scope of work to be undertaken for 2021/2022 is documented in (NLM-PLN-21/001). The three D&D stages are categorised as follows:

Stage 1: Decommissioning and waste management of all disused historical nuclear facilities.

Stage 2: Decommissioning and waste management of all remaining (currently operating) nuclear facilities.

Stage 3: The disposal of certain long-lived and high-level waste (including SAFARI-1 spent fuel) when an appropriate disposal facility for such waste become available.

Decommissioning services

The Decommissioning activities are divided into three phases:

- Phase 1: Entails the removal of source material and partial dismantling of the process system.
- Phase 2: Entails dismantling of process systems and decontamination of the facility.
- Phase 3: Further decontamination/ cleaning of the facility to achieve the decommissioning end point and clearance from regulatory control.

Table 18: Decommissioning projects

The following decommissioning projects activities were performed during the 2021/22 financial year:
The de-heeling of UF6 cylinders in Area 27
Phase 2 - Consolidation of remaining UF6 in Area 27 (Cylinder de-heeling) This project is progressing slowly due to the slow cylinder washing process, challenges experienced with the delivery of the nitrogen gas deliveries as well as the aging of the equipment and related infrastructure. There were difficulties experienced with the cleaning the contents of some population of the cylinders which needed to be investigated. It was therefore decided that upgrading the facility is not necessary because only a few population of cylinders remain to be de-heeled before the project is completed.
Phase 2 - Decommissioning of the conversion facility Currently, the NNR's comments on The Hazard Assessment Report (NIL10B0027) and Decommissioning Strategy (NIL10B0028) are being addressed. The NNR's comments necessitate the revision of the project schedule and a new project strategy to be developed on the use of localised ventilation or refurbishment of the existing facility ventilation. Engineering Services will perform the evaluation of the ventilation system.
Phase 3 Decommissioning facilities **i) Building P-2800** P-2800 building was previously used as a pilot UF4 Production Plant and operations were ceased in 1985. During 2002 and 2003, Building P-2800 was used by the Metox facility and an oven was installed for the high melting temperature of zirconium sand. This oven was never commissioned. All equipments were removed from the facility in 2004 and the facility is currently in a state of care and maintenance. The objectives planned Phase 3 D&D Decommissioning activities is to take the facility out of the regulatory control or for future limited reuse. The following activities were performed this financial year: Project initiation and documentation is in progress. o SHEQ requirements and security categorisation has been completed. o RP characterisation was completed and the report is being finalised.

- Decommission Strategy and Hazard Assessment is being developed for submission to the NNR for authorisation approval.

ii) J-Building

Phase 2 decommissioning on J-Building was completed mid-2001 and the facility is currently in a state of care and maintenance. Building was previously used:

- For accommodating two prototype Y-Plant cascade stages.
- For early surface fluorination tests on components.
- As a Separation Element Assembly (SEA) test facility.

The objective of planned Phase 3 D&D project activities is to first take J-Building out of the regulatory control and ultimately demolish the building. The following activities were performed this financial year:

- SHEQ requirements and security categorisation has been completed.
- Clearing and cleaning of the facility in underway.
- RP characterisation planning is underway.
- Decommission Strategy and Hazard Assessment are being developed for submission to the NNR for authorisation approval.

iii) XB Building

Building XB was used to test the efficiency of newly-built and decontaminated Separating Element Assemblies (SEAs) using UF6 (nat) as a process gas. Phase 2 decommissioning has been completed in 2001 and Building XB is currently under care and maintenance. The objective of the planned Phase 3 D&D activities is to take the facility out of regulatory control. The following activities were performed this financial year:

- SHEQ requirements and security categorisation has been completed.
- Hazard identification and risk assessment were completed.
- Emergency documentation and training are in progress.
- Cleaning and clearance of facility is in progress.
- Investigation of where equipment will be transferred was completed.
- Transfer of solid waste drums to Pelstore is in progress.
- Radiological characterisation is in progress.
- The Decommission Strategy and Hazard Assessment were submitted to the NNR for authorisation of the Phase 3 D&D activities – the NNR's comments and approval are being awaited.

Decontamination of the P-1600 Actinide laboratory glove boxes (P-1600)

- The laboratory was historically used for processing or operation involving the handling of Plutonium (Pu-239) based chemicals and related radionuclide materials and solutions.
- The laboratory and glove boxes still contain some of the chemical solution from the historic operation and some of the waste is still stored in the facility.
- This project the objective is to decontaminate/cleaning the actinide laboratory glove boxes in R38 Building.

The following activities were performed in this financial year:

- Development of project description and risk management plan was completed.
- The SOP on handling of liquid is about to be completed.
- Procurement of transparent cardboards and drip trays is complete.
- Baseline urine analysis of personnel is complete.
- Development of radiation protection programme is in progress.
- Decontamination of Room 176 in P-1500 laboratory.

Laboratory 176, previously used for radiological research and development, and is situated in the south wing of P-1500. The facility is currently under care and maintenance. The P-1500 South Wing is situated in the southern side of building P-1500 and is separated from the P-1500. Office Block by a lockable door. The P-1500 South Wing utilises a separate ventilation system from the rest of P-1500. The objective of this project is to take the facility out of regulatory control. The following activities were performed this financial year:

- SHEQ requirement and ventilation evaluation are complete.
- Radiological characterisation is in progress.
- Care and maintenance.

Various facilities, including BEVA evaporation pans, (previously radiologically contaminated) on the Necsa site are under care and maintenance. These facilities (all under NNR authorisation) are inspected and monitored (radiologically) as scheduled.

Table 19: Below are the facilities under care and maintenance			
Facilities	**Facility description**	**Current status**	**Comments and anticipated decommissioning activities**
Building P 2700 A	Metox Pilot Plant.	Decommissioning preparation work was completed end of February 2010. Decommissioning was completed in December 2011.	Facility currently under care and maintenance licence.
Area 14 Oil Basement	Redundant enrichment process facility.	The cutting of pipes was completed in 2019. The current phase is the removal and decontamination of all pipes, the waste and clean the facility.	Equipment and cut pipes will be decontaminated for the processing in the smelter.
Area 16	Redundant enrichment process facility used for the LEU blending for the decommissioned semi-commercial enrichment plant. Redundant enrichment process cylinder storage facility.	Area 16 plant is under care and maintenance.	Decommissioning of facility awaiting approval of smelter to enable processing of redundant equipment. No additional processing (for example, size reduction) planned currently due to limited storage area for cut equipment.
Area 27	Redundant enrichment process facility used for transfer of UF_6.	De-heeling of UF_6 is licensed and progressing currently in progress.	De-heeling project is 81% complete and estimated to be in the 2022/2023 year and area could be utilised by the NFC.
C Building	Redundant enrichment process facility.	Facility under care and maintenance.	Facility controlled under care and maintenance programme.
CaF_2 pans (six)	Evaporation of contaminated liquids.	Facility under care and maintenance	Utilisation and Remediation Strategy for Thabana Complex was submitted to the NNR. The remediation of the CaF2 pans is included in the scope of the strategy which is awaiting approval by the regulator (NNR). Note: The Thabana Complex, as per the Nuclear Installation License (NIL-04), consists of Thabana Pipestore, Thabana Radioactive Waste Storage Facility, Thabana Containerised Radioactive Waste Storage Facility and CaF_2 Ponds.
D Building	Redundant enrichment process facility.	Hot and cold cutting activities are authorised by the NNR.	Re-Licensing of D Building of this facility is underway. URS was completed and IWO is required.
Dorbyl Area	Storage of redundant equipment and waste.	Facility under care and maintenance.	Facility operated under care and maintenance programme.
Evaporation Pans 1 - 5 & 6	Effluent/sludge storage facilities.	Facility under care and maintenance.	Facility operated under interim care and maintenance arrangements. A care and maintenance plan is scheduled and will be submitted to the NNR by the end of July 2021.
J Building	Redundant enrichment development/pilot plant.	Facility under care and maintenance.	The Phase 3 Decommissioning of this facility is underway.
Conversion Plant	Redundant uranium conversion plant.	Facility awaiting Phase 2 Decommissioning. Feasibility studies and procurement options are being considered for the use of a localised portable ventilation system.	Decommissioning preparation activities have not yet started and a reapplication of Decommissioning without ventilation was submitted in 2017. Ventilation will be evaluated and NNR comments to be addressed.

Table 19: Below are the facilities under care and maintenance			
Facilities	**Facility description**	**Current status**	**Comments and anticipated decommissioning activities**
U - Plant Area 74 laboratory	Redundant laboratories for conversion plant.	Facility under care and maintenance.	Facility currently under care and maintenance.
XB Building	Redundant SEA development/testing facility.	Facility under care and maintenance.	Facility under care and maintenance.
P 2900 (building only)	Redundant conversion process development/pilot plant.	Facility under care and maintenance.	Facility currently under care and maintenance licence.
E Building	Redundant enrichment plant - later used for MLIS development (also terminated).	Facility under care and maintenance.	Facility currently under care and maintenance licence.
BEVA Pans (A,B,E & 1-14)	Evaporation of contaminated liquids.	Facility under care and maintenance.	Facility currently under care and maintenance licence.
P1500	Redundant R&D labororatories.	Facility under care and maintenance.	The Phase 3 Decommissioning of Room 176 laboratory is underway. Inventory analysis is to be completed.
P1900	Redundant reactor development facilities.	R&D facilities.	Facility controlled under care and maintenance arrangements. The reuse of the laboratories is currently being investigated and a license request will be submitted to the Regulator if the reuse seems to be feasible
P1900 Plutonium Laboratory	Redundant reactor development facilities used for U and Pu process chemistry at laboratory scale.	Facility under care and maintenance.	Facility controlled under interim care and maintenance arrangements.
P 1600 Laboratory	Radio-analytical and research laboratories.	Specific glove boxes are under care and maintenance.	Aim is to submit a request to the NNR to remove all Pu contaminated glove boxes.
H-Building laboratories	Applied Chemistry facility.	Some facilities are used by Applied Chemistry group and others are under care and maintenance.	Ground floor facility controlled under care and maintenance licence.
YM Vacuum	Vacuum pump maintenance facility.	Facility under care and maintenance.	Facility controlled under care and maintenance licence.
Building 2800	Previously used as pilot plant for conversion of ADU to UF_4 for the P2900 conversion plant. Currently waste storage facility with concrete covered contamination inside facility.	Facility under care and maintenance. RP Characterisation was completed and the report is being finalised.	Phase 3 decommissioning of this facility. Decommission Strategy and Hazard Assessment is being developed for submission to the NNR for authorisation approval.
Area 40 (incl. Sub-area 40)	Redundant oil purification plant and decontamination facility as well as the basement in Area 24 contaminated by Area 40 ops.	The facility is being prepared to undergo Phase 3 decommissioning with the objective of being re-used.	The facility is under care and maintenance.

Decontamination Services

The Decontamination Facility consists of:

- The Wet Decontamination Section, where chemical decontamination techniques are used to recover nuclear materials.
- The Dry Decontamination Section where nuclear materials are physically and mechanically removed to recover nuclear materials.

Decontamination Services is currently in the process of constructing the smelter facility at A26 where radiological components will be decontaminated through metallurgical techniques.

The following activities were performed in this financial year:

- 290 batches originated from A-26 facility and quarantine storage facility were processed in the Decontamination Facility.
- 1156.58 kilograms of degreased oil pipes from area 14 were processed at the Dry Decontamination Facility.
- 527.49 kilograms of stripped copper tubings from area 26.
- 175 500 litres of liquid evaporated from the Decontamination Facility, as a result of the event caused by Nuclear Manufacturing that led to the increased volume of water that was evaporated.

Management of Nuclear Waste

Nuclear waste from various points of origin was collected and safely stored at the Necsa during the review period is as follows:

Table 20: Solid waste management

Type	Origin	Storage facility	Number received 2021/22	Total as at 31 March 2021
Drums	Facilities on the Necsa site and external clients	Pelstore	**1218** Received in storage facilities	**73 573** Received in storage facilities **66** Concrete drums were shipped to Vaalputs for reporting period
Spent fuel elements	SAFARI-1 storage pool.	Thabana Pipe Store	0	1160
Spent sealed radioactive sources	Clients throughout South Africa, specifically the healthcare sector	Area-24 Source Store	262	12447
Recovery of DSRS from SAFARI-1	Characterisation of DSRS	SAFARI-1	46	76
Recycling of DSRS	Clients throughout Africa	NTP	36	831
Smoke detectors	Clients throughout South Africa	Area-24 Source Store	1027	31428

- **66** waste shipments were conducted for this reporting period and the cumulative total number of waste packages transported and disposed of at Vaalputs is **6640** as at 31 March 2022.
- Area 24 Disused Source Storage Facility received sources around the country. These sources are characterised, conditioned safely stored in the facility. During the financial year April to March 2022, a total number of **254** Disused Sealed Radioactive Sources (DSRS) were characterised and conditioned.

Waste material loaded for disposal at Vaalputs

Waste characterisation is conducted on a continuous basis for safeguards and final disposal purposes.

A total of **2028** drums have been measured using the IQ3 scanner and the BNFL Segmented Drum Scanner respectively:

- The contents of **1883** drums have been physically verified and registered on the Waste Tracking System.
- Two tele-therapy heads were collected from IThemba Lab.
- **36** source were sent to NTP for recycling and re-use.
- The Mobile Hot Cell Unit performed conditioning of one 2000 Ci radioactive source and source condition process is still ongoing.
- One safety assessment report was compiled for the repatriation of disused radioactive sources for Namibia, the report was submitted to the SAHPRA for the import applications of **6** DSRS.
- A total of **15** DSRS were repatriated, **1** from Botswana and **14** from Namibia for the reporting financial year.

Waste characterisation is conducted on a continuous basis for safeguards and final disposal purposes.

Liquid Effluent Management (LEMS)

LEMS's core business is to receive, treat, and dispose of all industrial, low, and medium active radioactive effluent generated on the Pelindaba site. A comprehensive laundry service for work. Wear and PPE is also provided to Pelindaba facilities as well as ***ad hoc*** services to the NNR. The facility's main priority is to compliantly operate the facility under strict regulation and authorisation from relevant authorities.

During the reporting period, subject to the operational challenges due to the Covid-19 regulations that were enacted, LEMS continued to provide uninterrupted essential services to the generators and other clients who required such services during the lockdown period. All effluent releases were authorised by the relevant authorities (L&SA RPS & EMG) based on regulatory limits applicable. There were no unauthorised releases to the Crocodile River during this reporting period.

Table 21: The key performance indicators for liquid effluent treatment at LEMS for the period 2021/22		
KEY PERFORMANCE AREA	TARGET	ACTUAL
Limit environmental Impact	Annual dose ≤ 150 µSv	**2.878 µSv (1.91%)**
All releases to Crocodile River authorised and within regulatory requirements	100% Authorised releases	**100%**
Limit effluent releases to the Crocodile River	Total annual releases ≤ 250 000 m^3	**94676 m^3 (37.87%)**
Zero downtime to Customers	100% Plant availability	**100% (365 days)**

The Technology Evaluation Report published by the Necsa's Engineering Services Division recommended a complete replacement unit to be procured from overseas, but this was not approved due to a lack of available funding. At the end of this reporting period, there was an unforeseen mechanical failure of the gearbox, resulting in an estimated 12+ week shutdown of the MA process. This project is to be attended to in the next financial year. The 2022/2023 MTEF funding application was successful and this project will receive attention in the new financial year.

Table 22: Growth Initiatives Programme: Performance indicators, planned targets and actual achievements						
Key performance area	**Key performance indicator**	**Actual achievement 2020/2021**	**Planned target 2021/2022**	**Actual achievement 2020/2021**	**Deviation from planned target 2020/2021**	**Comment on deviation**
Stage 1 D&D Programme execution	D&D Programme execution (Stage 1): Execution of Annual Plan of Action as approved by DMRE.	27.01%	100%	81.08%	Target missed by 18.92%. Sum of four quarters: Target missed by 4.73%.	Work perfomed on some projects beyond the scope of the Annual Plan of Action

6.4.6 ENGINEERING SERVICES

Thabana Pipestore Extension

The Thabana Pipe Store is used as an interim storage facility for the SAFARI-1 Research Reactor Spent Nuclear Fuel (SNF) and the NTP U-Residue material from the NTP Hot Cell Complex (HCC). This interim storage facility was licensed under [1] in 1997 and extended in 2007 to include more storage spaces. The current extension will include both additional spaces for SNF and for the NTP U-Residue material. The extended TPS facility will be divided into two sections. One section to store the spent fuel from SAFARI-1 research reactor and a second section to store the U-Residue material from NTP HCC. The extension includes 48 additional pipes for SAFARI-1 spent fuel and 36 additional pipes for NTP U-Residue material.

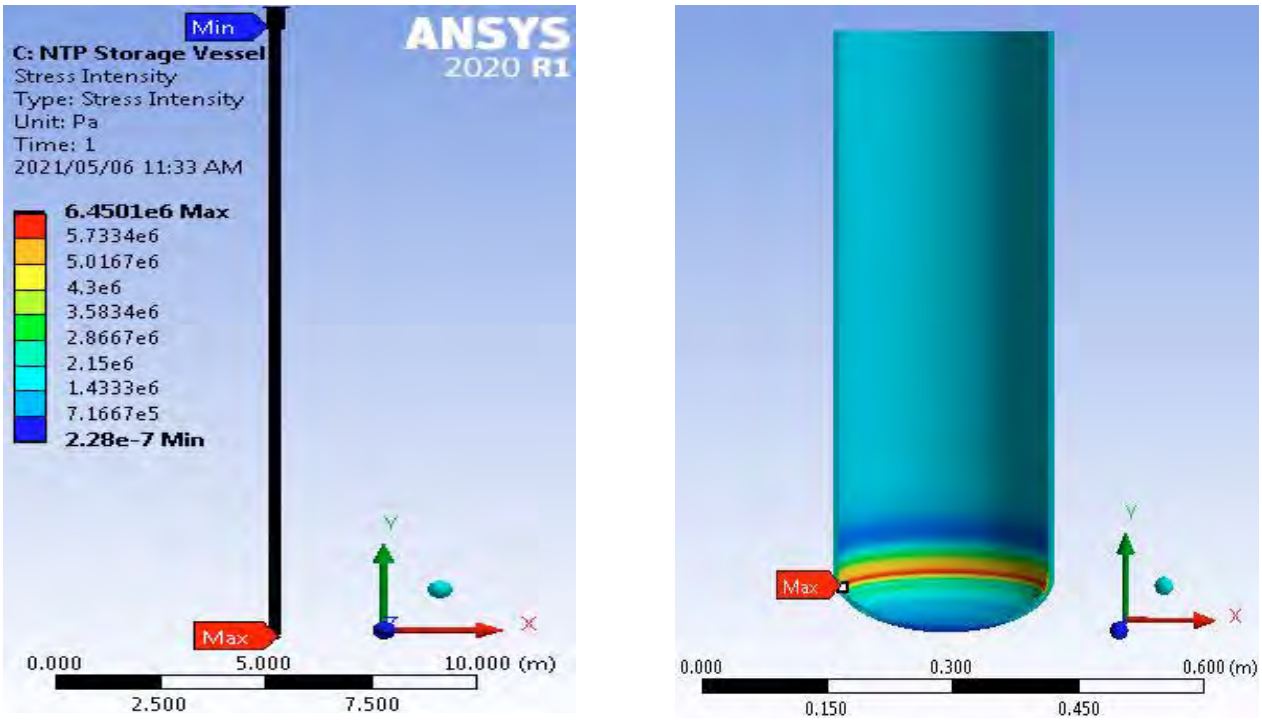


Figure 7: Some of the stress intensity analysis results performed for the NTP Storage Vessel

Overhead Eskom power supply

Safari rural is an 88/11kV substation situated in the Pelindaba area next to the NECSA's offices. The substation is supplied from Lomond MTS through 2x Lomond-Safari 88kV underground cables. The 88kV oil filled cables have deteriorated beyond repair.

The substation primary and control plant equipment have also reached the end of their life cycle span. They are old, non-standard and are a safety risk to the substation as well as operators. To address the issues above a refurbishment project has been initiated according to the Eskom pricing policies and the NERSA's guidelines. The Necsa was issued with a budget quotation for the both the premium and standard supply. The project is currently in the EIA stage and is expected to be completed in the next two year.

Project scope:

Line power plant requirements

- Build a new 1 x 88kV Chicadee overhead line from Lomond MTS to Safari Rural Substation.
- Rehabilitate the soil condition due to the oil spillage.

Sub-station power plant requirements

- Replace existing equipment on 1x 88kV feeder bay.
- Replace existing 88kV equipment on the 1x 88/11kVtransformer bay.

Sub-station control plant requirements

- Replace existing 1x 88kV feeder protection scheme.
- Replace existing 1x 88/11kV transformer protection scheme.
- Install new HV bus zone protection scheme.
- Install 1x optic fibre to Lomond MTS.
- Install 1x D20 RTU.
- Replace existing AC/DC with new AC/DC Panel and 1x Dual Control yard AC DB.

6.4.7 REAL ESTATE MANAGEMENT

Real Estate Asset Management (REAM) is a Property Management and Transport and Courier and Postal Services department of the Necsa Group responsible for efficient and effective management of the Property (immovable property) and Fleet (movable property) administration Portfolio, on behalf of Necsa Group.

Overview

The portfolio includes immovable assets (office buildings, laboratories, workshop/ warehouses, residential and land) and movable assets (sedans, passenger vehicles, trucks, and trailers), located all over South Africa, including assets at the Pelindaba site, Vaalputs site and Springbok. The REAM mandate focuses on improving the condition of properties, in order to provide safe and quality supporting facilities to the Necsa Group whilst growing the portfolio value through commercialisation. Despite the fact the majority of Necsa Group infrastructure was built during the 1960s and the 1970s, the infrastructure will continue to be central to the organisations' existence, and therefore will always need managing, often with less resource.

There is great potential in realising value through managing infrastructure well. At the core of REAM strategy is ensuring that the condition of the infrastructure is improved and continuously maintained to support the Necsa Group's business operations first whilst generating income through the exploitation of the assets and increasing income from immovable assets. This strategy supports and forms part of the Necsa Group's operational growth strategy.

Initiatives

Key initiatives aimed at the improvement of the non - core property assets have been launched to enable the REAM strategy:

Pelindaba Conceptual Masterplan

Introduction

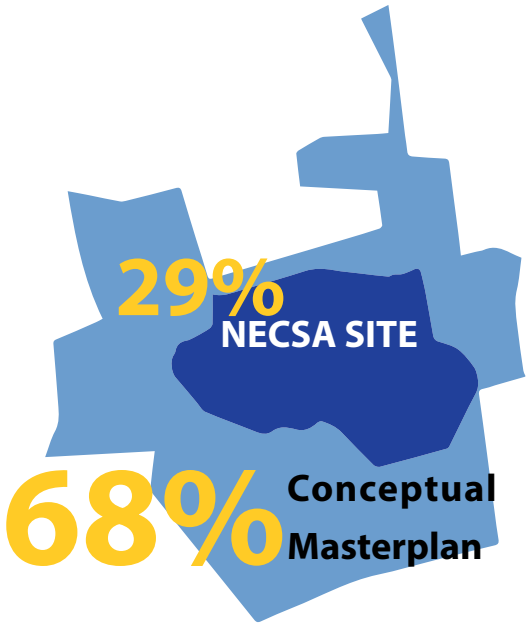
The Pelindaba Conceptual Masterplan is a 25-year blueprint that governs land administration and business expansion, within the Pelindaba precinct, in support of the Necsa's core business.

It provides a structured approach, and creates a clear framework for present and future land use and economic development on which assets can be managed through their asset life cycle, in order to:

- Improve the efficiencies within the Pelindaba property portfolio.
- Define the core property assets and the non-core property assets.
- Improve efficiencies by sweating the property assets and generating additional income, in terms of best practise in asset management.
- Improve efficiencies by sweating the property assets and generating additional income, in terms of best practise in asset management.

One of the key emerging strategies is the development of the concept master plan for the Pelindaba property in order to define core property assets and non-core property assets that can be exploited in order to improve property value and income.

DEVELOPABLE LAND



The total Pelindaba property is 2,361ha.
Necsa fenced area is 663.7ha (29%) of the total Necsa-owned property.
Conceptual Masterplan area is 1,624ha (68%).
The remaining 783.4ha (3%) is made up of roads (N4 and R104), and undevelopable land [wetland and steep slopes].

The total Pelindaba site property is 2,361ha. The Necsa-enced area is 663.7ha (29%) of the total Necsa-owned property and the remaining 783.4ha (3%) is made up of roads (N4 and R104), and undevelopable land (wetland and steep slopes).

The Conceptual Masterplan area is 1,624ha (68%), with remaining 783.4ha (3%) being made up of roads (N4 and R104), and undevelopable land [wetland and steep slopes]. The Necsa has kept 68%

of its land on the Pelindaba site vacant for several decades, in order to secure the formal emergency planning zone, or buffer area, (an area within a radius of 5 km from the SAFARI -1 Reactor, with a capacity of 20MW. Some asset improvement and commercialisation initiation projects have been rolled over for execution.

Pelindaba Conceptual Masterplan – Districts

The 25-year conceptual vision is directly linked to the specialised, high-value offer of the Research Reactor and affiliated infrastructure within the Necsa. It showcases South Africa's greatest export, and uses that to attract international medical tourists and scientists to come and stay in South Africa, thereby triggering a ripple effect on the tourism sector and the North West's economy.

It aims at creating a research and development hub into future Pelindaba site using nuclear technology both in the medical industry and into other sectors. Advanced, progressive thinking and development of science and technology ensures we keep our intellectual and local resources in South Africa. This conceptual masterplan aims at also attracting the brightest minds from the global arena to live, work, play and create here.

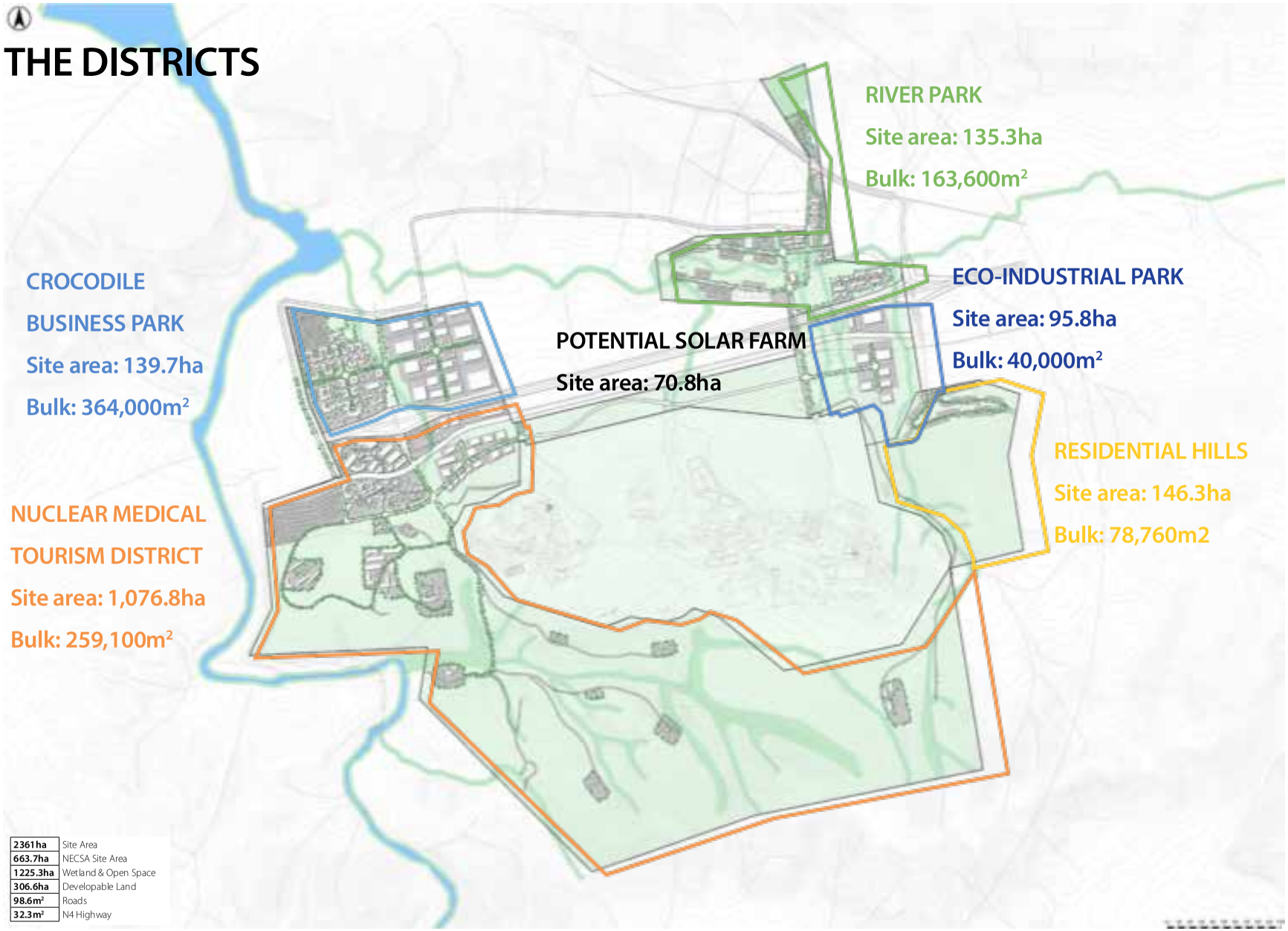
The Pelindaba Conceptual Masterplan has been portioned into six districts with distinctive characters. The six districts are:

- The Crocodile Business Park;
- The Nuclear Medical Tourism District;
- The Solar Farm;
- The River Park;
- The Eco-Industrial Park; and
- The Residential Hills.

These six districts have their own identity aligned with the concept of the Necsa's vision and mandate. The districts provide a conceptual vision of the potential variety of land uses offered in each district with the possible site area used, total floor area and density.

Minister Gwede Mantashe and Deputy Minister Dr Nkabane visit to the SAFARI-1

THE DISTRICTS



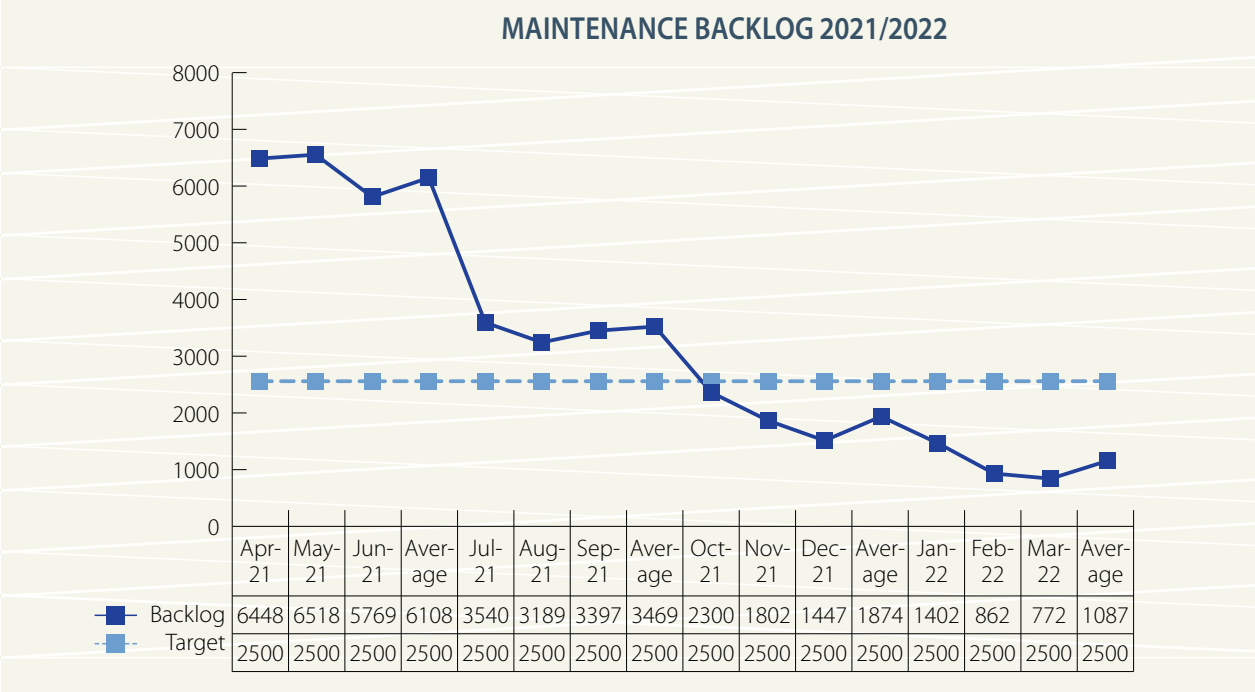
6.4.8 MAINTENANCE SERVICES

Highlights

- Maintenance Services managed to turn around the high maintenance backlog caused by the 2020 Covid-19 hard lockdown, from an unfavourable 10 000 tasks to 772 at financial year-end 2022, see Chart 2 below. At the beginning of the 2022 financial year the backlog was sitting at 6448, but came down to 772 by year-end.
- Despite the challenges that Maintenance Services is facing in terms of an inadequate OPEX and CAPEX budget, declining human capital, obsolete maintenance equipment, aging infrastructure; it managed to keep critical utilities plants functional.
- Maintenance Services put together a Site Infrastructure Aging Management Plan spanning from 2023 financial year to 2025 and applied for a R60m Medium-Term Expenditure Framework (MTEF) spread over three financial years with R20m allocated per financial year. The plan is to address the aging infrastructure.

Issues/challenges

- Inadequate OPEX and CAPEX budget.
- Aging site infrastructure putting a strain on depleted Maintenance Services human resources and obsolete equipment.



	Apr-21	May-21	Jun-21	Aver-age	Jul-21	Aug-21	Sep-21	Aver-age	Oct-21	Nov-21	Dec-21	Aver-age	Jan-22	Feb-22	Mar-22	Aver-age
Backlog	6448	6518	5769	6108	3540	3189	3397	3469	2300	1802	1447	1874	1402	862	772	1087
Target	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500

Chart 2: Maintenance Services backlog

Key Performance Indicators (KPIs)

Wherever the colour coding is used for performance it means the following:

	Target achieved or exceeded
	Acceptable deviation from target
	Target not achieved

Table 24 shows Maintenance Services performance on its main KPIs from Quarter 1 to Quarter 4 in the 2021/22 financial year:

Table 24: Schedule adherence (%)						
		Q1	Q2	Q3	Q4	Overall 2021/22 financial year
All maintenance	Actual	68	88	88	86	83
	Target	>85	>85	>85	>85	>85
Statutory maintenance	Actual	82	82	95	92	88
	Target	100	100	100	100	100
Preventative maintenance	Actual	81	88	88	85	86
	Target	>85	>85	>85	>85	>85

Customer Satisfaction Survey

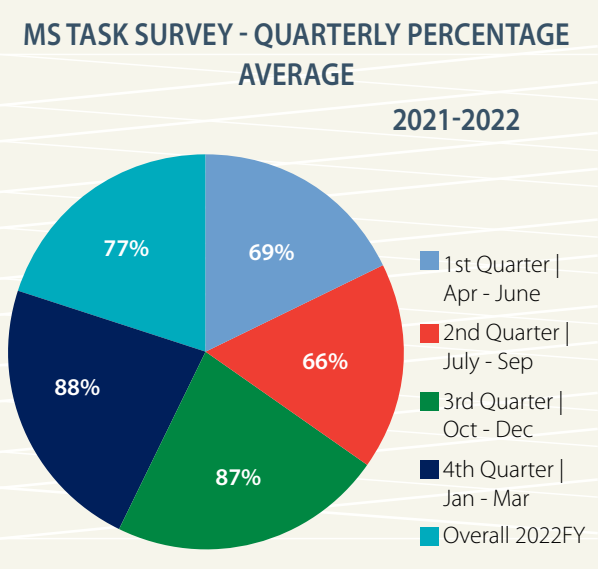


Chart 3: Maintenance Services customer satisfaction on task surveys

The customer satisfaction task related survey started at 60% and ended at 88% showing a gradual improvement that is attributed to more and more employees coming back to site after the Covid-19 lockdown.

6.4.9 UTILITIES SERVICES

Utilities Department mandate

The mandate of the Utilities Department includes efficient provision of the Necsa site utilities without interruption whilst adhering to the Water Permit as well as the Air Emissions Regulations and all related environmental regulation as well as conventional safety. Efficient production and distribution of utilities enables Necsa to use natural resources such as coal in an environmentally responsible manner. Statutory maintenance is carried out as scheduled.

Highlights/challenges

Takings into consideration the aging infrastructure, the production and distribution of utilities was as far as possible done with minimal interruption on the production facilities onsite. However, going forward, financial resources are required to replace and/or repair the major infrastructure as this will affect the production and distribution of utilities in the future. Furthermore, with possible increased site utilisation as well as the support utilities required for the MPR, the site infrastructure integrity becomes of utmost importance and is critical. The infrastructure referred to includes but is not limited to water pipes, steam production and distribution infrastructure as well as the electrical infrastructure.

The implementation of an Energy Management System (EnMS) going forward will assist for energy and non-energy benefits to be realised. To this end, and EnMS policy has been developed.

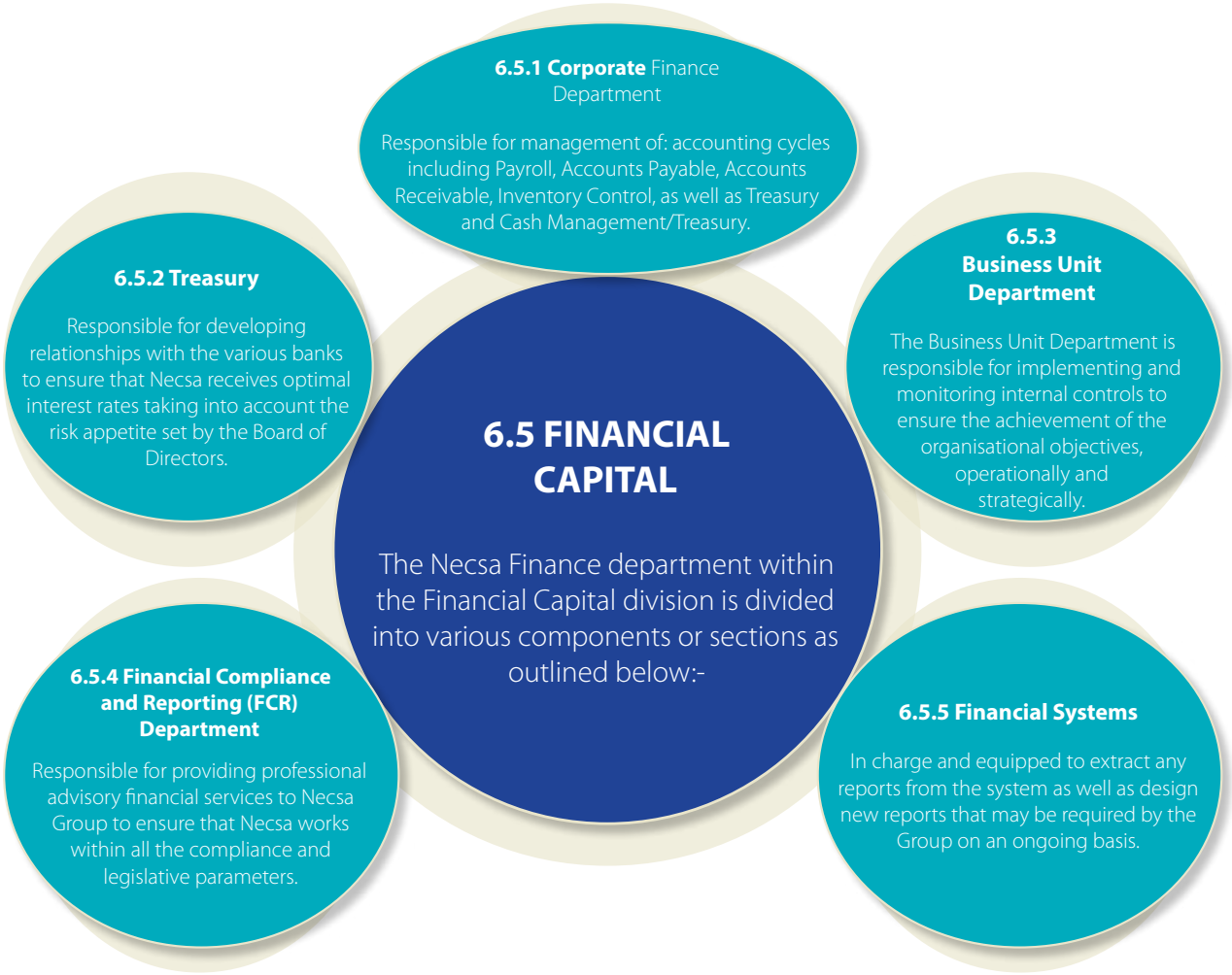
Eskom has started the EIA process for replacing the two underground cables with one standard overhead line as the two underground cables are obsolete. Due to limited financial resources required to replace "like for like", the standard overhead line was deemed suitable.

Environmental sustainability

Table 25: Natural capital indicators		
Annual electricity usage	58.5GWh	April 2021 to March 2022 (FY)
Annual water usage	922 700m^3	October 2020 to September 2021 – Water Year

6.5 FINANCIAL CAPITAL

The Necsa Finance department within the Financial Capital division is divided into various components or sections as outlined below:-



6.5.1 FINANCE OVERVIEW

A sound strategic financial department has a complete view of company operations and considers how every function and role affects the overall financial position of the company. The Finance Department is one of the major pillars of any organisation and an essential ingredient to a successful business. An essential task of the Finance department is concerned with managing daily financial decisions and balancing them with long-term company objectives within a sound and good corporate governance environment. The long-term, medium-term, and short-term goals are synchronised through the company's financial predictions that are provided by the Finance department. It is increasingly important that management within Finance are strategists, assisting to shape overall strategy and direction, and are catalysts, instilling a sound financial approach and mind set throughout the organisation to ensure that the other parts of the business perform at their optimum.

The Finance division department is responsible for the stewardship and control of physical and financial resources within the Necsa. In this regard, the tension is to try and balance the four key priorities i.e. cost reduction, compliance, efficiency and growth. The activities expected from the Necsa Finance component cover a wide range of activities from basic valid, accurate and complete record keeping to providing strategic direction and decisions to the entity, especially as pertains to finances. The Finance Department oversees the Necsa's processes at a micro- and macro-levels.

Finance plays a significant role in the decision-making process, the vision, mission and strategy of a company remain the guiding principles. Part of the importance of the Finance department lies in its function of aligning daily financial decisions with longer-term company objectives. Short-, medium- to long-term goals are effectively synced with a broader vision expressing the mandate of the Necsa Group in financial terms.

6.5.2 SUPPLY CHAIN MANAGEMENT

Summary

The Supply Chain Management (SCM) Department develops relevant policies and procedures while also managing compliance with these legislation and codes of good practice. In addition, SCM provides central receiving and inventory management, strategic sourcing and contract management.

Procurement spend in 2021/22

Table 27: Summary of orders per division	
Division	**Amount**
Engineering & Tech. Services	R22 297 263,65
Finance	R55 321 759,72
Human Resources and REAM	R9 794 811,11
Nuclear Compliance Services	R7 009 630,27
Office of the CEO	R3 390 430,29
Operations	R38 201 940,08
Pelindaba Enterprises	R49 484 629,49
Research and Tech Development	R8 191 368,63
Special Projects Necsa/Niasa	R6 571 251,42
Pelchem	R150 812 752,54
NTP	R152 539 287,61
Grand Total	**R503 615 124,81**

Table 28: Top ten suppliers to the Necsa Group	
Vendor name	**Value**
SASOL OIL (PTY) LTD	R 22 005 873,60
MERISMA TRADING ENTERPRISE (PTY) LTD	R12 911 500,00
NUSIM S A U	R12 907 969,60
LESEDI NUCLEAR SERVICES (PTY)	R12 717 856,18
M AND M TRAINING AND RIGGING C C	R9 483 458,22
TRACTEBEL ENGINEERING PUBLIC LIMITED	R5 513 716,02
BATLOKWA GROUP (PTY) LTD	R4 334 091,07
GRIESEL CONSULTING AND ADVISORY (PTY)	R3 495 500,00
ARIOGENIX (PTY) LTD	R3 489 437,50
NEW AGE ENGINEERING SOLUTIONS CC	R3 188 957,92

Table 28: Top ten suppliers to the Necsa Group	
Vendor name	**Value**
Grand Total	**R90 048 360,11**

Table 29: Supplier database			
Vendor type	**Registered**	**Vendors put on hold**	**New registrations and vendors made active**
EC – Active vendors (Registered on database)	2560	29	125 + 24(149)
ZZ-Vendors (Cash vendors registered on database)	1190	11	22+9(31)
Total active vendors registered on system	**3750**	**40**	**180**

B-BBEE verification 2021/22

The B-BBEE verification is in process. The verification agency will issue the B-BBEE certificate once the verification is concluded.

6.6 PELCHEM

PELCHEM MD: MR UMESH NATHA

MANAGING DIRECTOR OVERVIEW

Pelchem is showing positive signs of moving out of recessive state as it strengthens its balance sheet albeit slower than envisaged. I am especially proud of the company achieving full compliance with its operating licence conditions.

The year under review was a difficult year for the country and Pelchem was negatively affected due to the national lockdown to combat the Covid-19 pandemic. The pandemic plunged the global economy into recession and the local manufacturing sector continued to contract. Furthermore, Pelchem's financial performance was negatively impacted by break downs experienced on the HF plant as a result of lack of required investment as well as the delay in completing the Bulk Fluorine Filling Station project. The short-term priority for Pelchem continues to be completing the refurbishments of its current production facilities so that the effective reliability of plants is improved.

Cash and cash-flow management measures continued to be integral in managing operations and some of the measures implemented in this regard included freezing the appointment of key positions, daily managing the procurement of raw materials and maintenance spares and salary pay date moved to last day of the month. As a result of the extremely challenging trading conditions, Pelchem ended the year with a loss of (R63.5m) against a budgeted loss of (R43.3m).

The operationalisation of the State Owned Pharmaceutical Company, "Ketlaphela Pharmaceuticals SOC Ltd" has continued with the required processes to secure regulatory approvals from the South Africa Pharmaceutical Council (SAPC) and South African Health Products Regulatory Authority (SAHPRA) well underway.

The Pelchem management and employees need to be recognised for their responsiveness during this difficult period.

I would like to thank Minister Gwede Mantashe, the Department of Mineral Resources and Energy and the Board for their guidance and support, our stakeholders including customers and suppliers, for their continued support. Our staff (the Pelichamps) - we recognise and appreciate your valuable contribution to the organisation.

Stay safe.

UMESH NATHA

MANAGING DIRECTOR

PELCHEM SOC LTD

ABOUT PELCHEM

Company Description and Overview

Pelchem is a small world class manufacturer and supplier of fluorochemicals to a wide variety of market segments. Pelchem was corporatized in 2007 as a wholly owned subsidiary of the South African Nuclear Energy Corporation SOC Ltd "Necsa", however, it has been in operation for over 35 years developing its own technology and experience. Pelchem is a critical supplier of Hydrofluoric Acid and Fluorine to the Automotive, Refineries, Stainless Steel, Plastic Packaging and Mining Sectors both in South Africa and globally. Pelchem further exploits its patented technology through the production and supply of high value specialty products exported into the Fluoropolymer, Pharmaceutical and Semiconductor industries.

Market Segments

- Semiconductor/electronics
- Fluoropolymers
- Petrochemicals (plastics)
- Pharmaceuticals/cosmetics
- Industrial (stainless steel, alloys)
- Mining
- Fluorocarbons (cooling/refrigeration)*
- Agrochemicals (pesticides/fertilisers)*
- Consumer products*

An asterisk * denotes that this is a future segment

Major Export Markets

Table 30: PELCHEM HIGHLIGHTS AND LOWLIGHTS FOR 2020/21	
HIGHLIGHTS	**LOWLIGHTS**
• Pelchem Board approval of its new Turnaround Strategy which is premised on product mix optimisation, reliability-centred maintenance programme, phased plant investments based on cash flows, and successful completion of the Bulk Fluorine Filling Station project. • Improved revenue (cash) collection. • Successful ISO 9001:2015 recertification.	• Missed production targets due to the increasingly deteriorating plant performance. • Missed sales due to customers' lockdown and reduced demand. • Loss of man-hours due to national lockdown, • 61.5% vacancy rate at management level, inability to fill positions due to constrained financial position. • Contracting manufacturing sector in South Africa. • Lack of investment in upgrading the production infrastructure.

KETLAPHELA PHARMACEUTICALS SOC LTD PROFILE

Ketlaphela Pharmaceutical SOC Ltd ("Ketlaphela") was created in response to the Cabinet's directive in 2009 for South Africa to have its own State-owned pharmaceutical company. Ketlaphela was established in 2015 as a wholly-owned subsidiary of Pelchem SOC Ltd. The mandate of Ketlaphela as a wholly State-owned pharmaceutical company is to contribute to implementing the government developmental objectives not fully served by the private sector through the localisation of Active Pharmaceutical Ingredients (APIs) and final formulated pharmaceutical products mainly for communicable diseases such as HIV/AIDS, Tuberculosis (TB), malaria and later on, lifestyle diseases.

Ketlaphela's business model is to ensure sustainability through product diversification while it endeavours to secure state off-take for HIV/AIDS pharmaceutical products.

EXPANSION AND GROWTH PROJECTS

Pelchem seeks to advance longer-term sustainability by developing commercially scaled Fluorochemicals facilities (Project Thuthukani). This project will be revisited and advanced during the 2022/23 financial year.

Pelchem

6.7 NTP Radioisotopes SOC Ltd

NTP MD: Mr Thabo Tselane

GROUP MANAGING DIRECTOR OVERVIEW

The NTP Radioisotopes SOC Ltd group (NTPG) finished the financial year on a high note with continued safe and sustainable production in full compliance to regulatory requirements. This was supported by the ongoing successful implementation of the Sustainable-Return-to-Service Programme (SRTS) in the NTP's API production facility that was initiated in 2019.

NTP had no disabling injuries and the total injury rate of 2.09 at financial year end (FYE) remains well below the upper limit of 4.00 at NTP's Pelindaba Operations. In addition to the commendable safety performance and an improved safety culture, production levels for all NTP products and services increased substantially in the latter part of the year with excellent year end numbers compared to the previous financial year.

The API production levels in 2021/22 were the highest since 2017/18 and exceeded those of 2020/21 by 10% and 45% for Mo-99 and I-131 respectively. These increased sales demonstrate how NTP is slowly regaining its lost global market share. The Radiopharmaceutical production excelled with a 26% year-on-year increase, mainly because of an increase in FGD sales and Tc-99 generator exports. The number of Lu-177 doses supplied domestically increased by 40% and the Lu-177 API exported doubled compared to the previous financial year. A customer satisfaction survey was conducted for the 2021 calendar year and NTPR achieved an average rating of 89%.

The NTP Radioisotopes year-end sales totalled R943.1m that are 11% below budget and 29% higher than previous financial year's. The API's and specifically Mo-99 remained the dominant product grouping. Year-on-year revenue growth was achieved in all product categories and the contribution of non-Mo-99 products increased in compliance with NTP's KPA's. Lu-177 had the highest Y-o-Y percentage increase of 79% compared with 2020/21 while Mo-99 had the highest revenue increase of MR145.2 in same period.

The NTP Group (NTPG) of companies' revenue at year end totalled R1168.8m, 6% short of budget. A significant contributor to this shortfall is the stronger than budgeted Rand-US Dollar exchange rate. The Net Profit after Tax (NPAT) for NTPG amounted to R73.3m and was R18.4m below budget. This performance must be seen against the backdrop of restrictions and challenges associated with CoviD-19 pandemic which also resulted a general decline in the global demand for NTP's products and services, compounded by various global logistics challenges to have the product delivered to customers as expected. The logistics situation improved slightly but on average 6.9% of all shipments still experienced delays in the latter part of the financial year.

MR THABO TSELANE

MANAGING DIRECTOR: NTP RADIOISOTOPES SOC LTD

NTP OVERVIEW

The South African nuclear industry dates back to the mid -1940's where the AEB was established to oversee the mining and trading of uranium in South Africa. In 1991 South Africa signed the NPT and in 1993 became the first and only country to abandon its weapons programme voluntarily. The Nuclear Energy Act (1982) renamed the AEB to NUCOR and combined it with UCOR under the AEC as a controlling body. The current Nuclear Energy Act (1982) transitioned the AEC to the Necsa. NTP Radioisotopes SOC Ltd is a wholly-owned subsidiary of Necsa and has operated as a division of the Necsa from the early 1990s.

The NTP champions the cause of radiation-based medical supplies and services within the Necsa Group. The first export orders for the key medical radioisotope Molybdenum-99 were supplied in 1994. Since then, NTP is one of the key global commercial producers of Molybdenum-99 and Iodine-131.

Being customer-focused, and socially and environmentally responsible, the NTP has put South Africa on the world map as a promising emerging market, contributing around R1-billion in local and international radiopharmaceutical revenue annually. In 1989, the NTP began producing and distributing its own high-yield Technetium-99m generators, used by nuclear medicine practitioners in the Southern African Development Community. In 2005, the NTP began to produce on-site cyclotron-based FDG F-18, which is used for cancer diagnosis. This was done in partnership with the NRF's iThemba LABS.

A global milestone was achieved in June 2009 when the SAFARI-1 reactor first fuelled up its core using low enriched (non-weapons grade) uranium (LEU) instead of the highly enriched uranium (HEU) used previously. In 2010, the NTP became the first large-scale producer to offer commercial all-LEU-based Mo-99 and Iodine-131 in which both the fuel and the targets were LEU-based. The NTP established a partnership with the Australian Nuclear Science and Technology Organisation (ANSTO) in September 2012, in terms of which a large-scale Mo-99 production facility was constructed at the ANSTO using the NTP's technology and expertise, supported by the ANSTO's extensive capabilities and experience.

Also in 2012, the NTP began the first African-based production of the non-carrier-added (n.c.a.) beta-emitter Lutetium-177 (Lu-177), which has diagnostic and therapeutic applications. The NTP later facilitated the first medical procedure in South Africa using Lu-177 n.c.a. labelled with prostate-specific membrane antigen (PSMA) for the treatment of prostate cancer. In 2020, the NTP processed its first export sale of Lu-177 n.c.a. API, and launched a new diagnostic product, F-18 PSMA. In 2021, the NTP continued its production and delivery of its products, yielding a year-end sales of 29% higher than previous financial year.

Minister Mantashe and Deputy Minister Dr Nkabane visiting NTP

Table 31: NTP HIGHLIGHTS AND CHALLENGES

Highlights	Challenges	Highlights
As an essential products and services provider, the NTP was able to safely continue working throughout the year to deliver important medical products and supplies to its clients.	• Market remains lower than pre-Covid-19 levels. There are restricted international logistics options, but international shipments has marginally improved since the previous quarter. • The NTP was deeply saddened at the loss of two of its people in the year, due to Covid-19.	Radiopharmaceutical production excelled with a 26% year-on-year increase in revenue, mainly because of an increase in FGD sales and generator exports.
The SRTS Programme is now completing the optimisation phase of its rollout and will be moving toward embedding the growth phase over the next financial period.		The number of Lu-177 doses supplied domestically increased by 40% and the activity exported to ITM doubled compared to the previous financial year.
The NTP Group revenue at year-end totalled R1168.8m, 6 or 11% short of budget. A significant contributor to this shortfall is the stronger than budgeted Rand exchange rate. Net profit after tax for the NTP Group amounted to R73.3m that is R18.4m below budget.		A customer satisfaction survey was conducted for the 2021 calendar year and NTP achieved an average rating of 89%.
API production levels in 2021/22 were the highest since 2017/18 and exceeded those of 2020/21 by 10% and 45% for Mo-99 and I-131 respectively.		No disabling injuries were recorded and the total injury rate of 2.09 at year end (YE) remains well below the upper limit of 4.00 at NTP's Pelindaba operations (NTPR). NTP Radioisotopes and Gammatec has received a clean audit opinion from the Auditor General. NTP Logistics received an unqualified report, AEC Amersham obtained a qualified opinion.

6.7.1 NTP GROUP SUBSIDIARIES AND ASSOCIATE COMPANIES

6.7.1.1 AEC-Amersham SOC Ltd

AEC-Amersham SOC LTD

NTP has a 100% shareholding in AEC-Amersham SOC Ltd, which is the exclusive distributor in Africa of NTP's radiopharmaceutical products as well as a range of life science research and other products.

Highlights

- AEC-Amersham has been awarded a three-year tender for KwaZulu-Natal hospitals – Inkosi Albert Luthuli Academic Hospital, King Edward VIII Hospital and Addington Hospital for the supply of radiopharmaceuticals and nuclear medicine consumables – the tender value is estimated at R12 million.
- New locally produced product, Lu-177 PSMA, has become availe from 12 August 2021. This changes the landscape in prostate cancer treatment. Health Technology Assessment (HTA) with Discovery Medical Aid is in progress – if approved, patients will not have to pay out of pocket for this treatment.

Lowlights

This biggest challenge AEC faced during the 2021/22 financial year was:-

- AEC's IT systems was hit by ransomware on 5 August 2021. The SAP system crashed and was inaccessible. It was very challenging in August to do things manually. Data on the SAP system could not be recovered fully from the SAP server. Only data up to January 2021 was recovered. The external year-end audit couldn't be completed as the SAP system was inaccessible. However; data is available on laptops and will be manually re-captured into SAP.

6.7.1.2 NTP Logistics SOC Ltd

NTP Logistics is a joint venture company between NTP Radioisotopes (51 %) and a BEE partner, specialising in managing the logistics of dangerous goods including radioactive materials.

Highlights

- Increase in revenue compared to previous year.
- New business ventures.
- Zero safety incidents.
- Targets achieved and exceeded.

Lowlights

- Due to Covid-19, there were shipment delays.

6.7.1.3 Gammatec NDT Supplies SOC Ltd

In October 2009 NTP acquired a 55% interest in the Gammatec NDT Supplies SOC Ltd group. Gammatec focuses on the provision of a wide range of NDT (non-destructive testing) equipment, including Ir-192 sources supplied by NTP, and Kodak film for X-ray and gamma radiography and Ultrasonic equipment and accessories manufactured by Sonatest NDE (for which they hold exclusive distributorship rights).

Highlights

- The year's financial targets were achieved.
- Oserix, equity associate company of Gammatec had a good financial year (January to December 2021).
- The strengthening Rand against the US$ made for reversals of prior exchange rate gains, which resulted in a positive collection process and, long overdue accounts were minimised.
- A Board assessment performed by the Institute of Directors produced an excellent overview of governance, highlighting deficiencies, but scoring the Board and company's processes at a very high level.

Lowlights

- Stock ordered has been unable to be shipped due to erratic flights.
- Suppliers have been unable to get raw materials and the recent spate of feud between Ukraine and Russia has had a negative effect on supplier and pricing.
- Injury rate not achieved - training provided.

HUMAN CAPITAL MANAGEMENT

Introduction

The primary mandate of the Group's HR department is to provide strategic human resources support services that should enable the Necsa Group to build organisational capabilities to achieve its strategic objectives and thereby deliver on its mandate. Flowing from this mandate, the derived strategic goal of the Necsa Group's HR Department is to pursue excellence in human capital management practices in order to position the Necsa Group as an employer of choice.

Strategic objectives

- **To ensure continuity of supply of core and critical skills required**
- **To promote a culture of high performance**
- **To create an organizational culture that promotes employee engagement and satisfaction.**
- **To achieve Necsa Group's targets for transformation, social, and economic responsibility**
- **To achieve sustainable growth by meeting the evolving needs of our customers in training and skills development**

Key service delivery pillars

- Integrated talent management strategy
- Enabling organisational culture that promotes employee engagement
- Leadership and Management Development
- Sound Employee Relations
- Well embedded Performance Management and Remuneration practices
- Compliance with statutory requirements and internal prescripts
- Sustainable employee wellness and benefits programmes

Key Human Resources Challenges

The ability to achieve transformational objectives in certain key areas of the organisation where diversity is lacking.

Solution: Effective implementation of the organisation's talent management framework to facilitate the attraction, retention, and development of young workforce.

HR priorities for the year under review

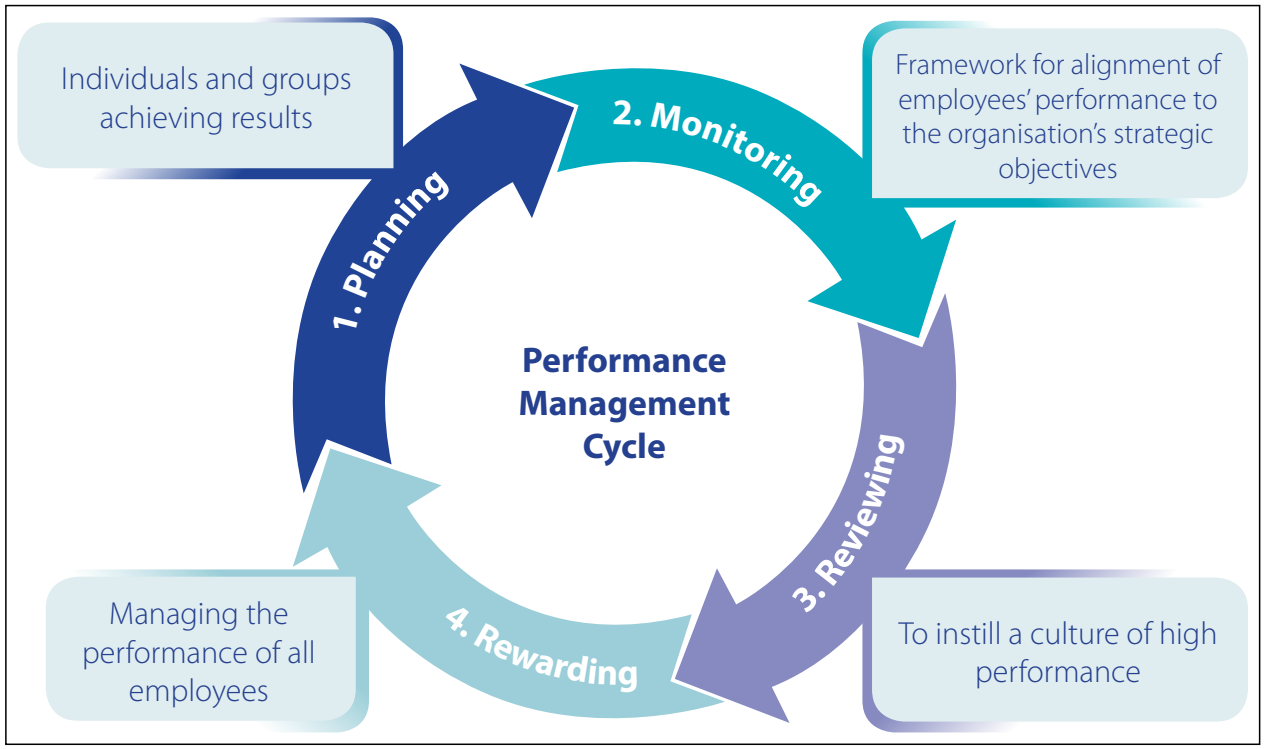
- Development and Implementation of integrated talent management programme.
- Developing and implementing programmes to ensure performance management culture is fully embedded within the organisation.
- Development and implementation of programmes for creating an environment that is conducive to sound employee relations and wellness.
- Implementation of Leadership Development Programme.

Restructuring and Rationalisation

As part of a drive to change the organisations from being financial deficit amidst the ever declining government grant to one that is financially sustainable, a restructuring exercise which gained momentum during the reporting period was embarked upon and the Human Capital Division played an instrumental role driving the process.

Some of the key milestones achieved during the year was the development of new high level structure for the Necsa group and the filling of executive positions with candidates who will also improve the organisation's transformation objectives. At the time of reporting, the roll-out of the new structure and placement of candidates below the executive levels was still underway.

Employee performance management framework



The achievement of the Necsa's strategic objectives is dependent on individuals and groups achieving results which are linked to the organisation's strategic objectives. Performance management provides a framework for alignment of employees' performance to the organisation's strategic objectives, as well managing the performance of all employees to instil a culture of high performance. To that end, the primacy of performance management was articulated in the sessions that were held across the organisation through workshops to ensure that the momentum is maintained.

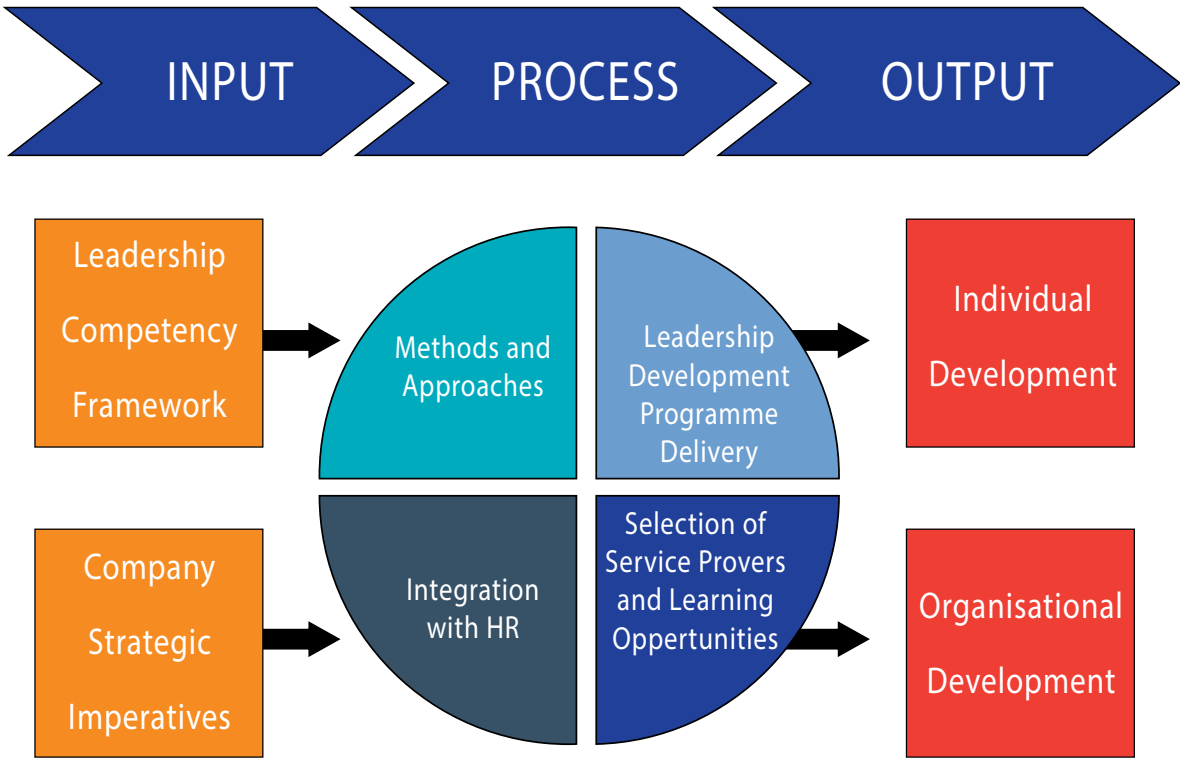
Talent Management

The Necsa Talent Management Framework integrates the identification, review and optimisation of talent in order to identify a Necsa Talent Pipeline, facilitate succession planning, and to ensure development of talented employees.

This integration will help in attaining the following specific objectives:

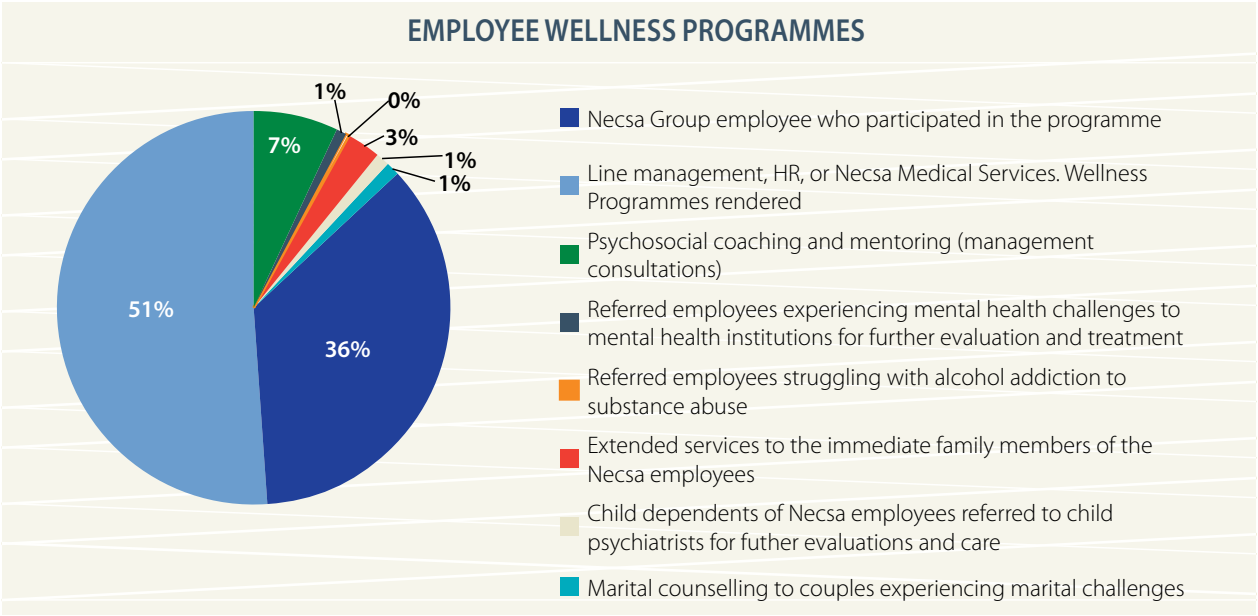
- Building a sustainable organisation with the right skills and capabilities.
- Providing a common methodology to review talent.
- An annual review of the health of talent pipelines against current and future business requirements.
- Identifying gaps in the supply and development of critical talent.
- Ensure succession intelligence.

Figure 8: Leadership Development Framework



7.1 EMPLOYEE WELLNESS PROGRAMMES

The Employee Wellness Programme is a crucial resource that supports the employees' wellbeing needs. Beyond supporting employees who experienced the psychosocial challenges, the programme played a vital role in supporting employees in dealing with the challenges triggered by Covid-19 and the vital company's rationalisation project. The following information is worth reporting:



In terms of health and wellbeing promotion, the Employee Wellness Programme proactively raised the awareness of vital wellbeing issues through webinars and articles published in the ***Necsa Today*** newsletter.

Wellbeing articles published	Webinars
• World Tuberculosis Day 2022 (March/ April 2022 edition of ***Necsa Today***). • Drug abuse and illicit trafficking (September 2021 edition of ***Necsa Today***). • Mental Health Awareness Month (December 2021 edition of ***Necsa Today***). • Stress awareness month (April 2021 edition of ***Necsa Today***).	• Vaccination Awareness Talk, led by onsite doctor from a Necsa medical station. • Cancer Awareness Talk led by Professor Michael Herbst from the Cancer Association of South Africa. • Mental Health and the Aspects of Covid-19 pandemic awareness talk led by a Mental Health Specialist, ucille Zwemstra from the Beethoven Recovery Centre. • Virtual World AIDS Day event hosted by World Health Organisation.

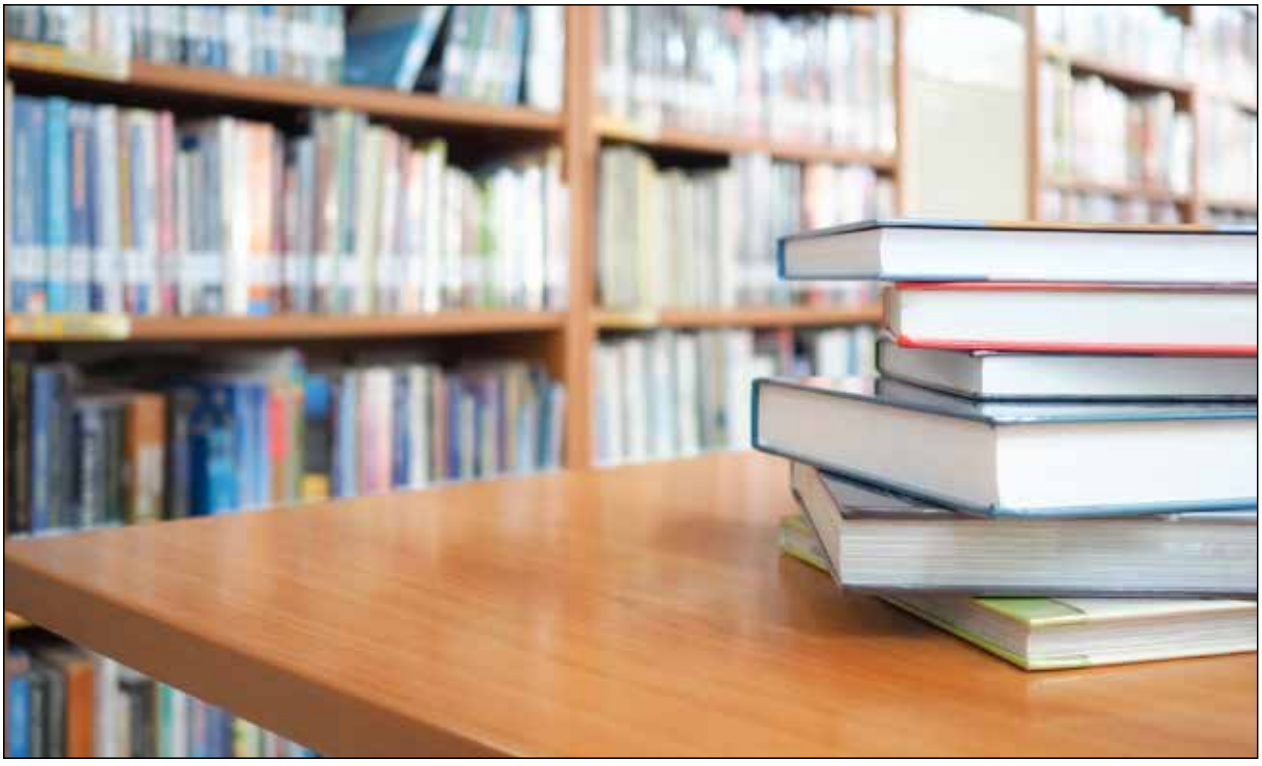
7.2 KNOWLEDGE MANAGEMENT

The Knowledge Management (KM) activities within the Necsa are guided by an approved policy, strategy and a number of key processes. The key processes are implemented through the activities within three functions of the KM Department: Knowledge Management Function, Library Services and Document Management & Archiving Services. The activities within the department was significantly scaled down due to the impact the national lockdown had on KM activities during the financial year.

Knowledge Management Function

A key process within the Department is the performance of knowledge loss risk assessments throughout the Necsa to assess the risks associated with the loss of knowledge of certain key and critical roles. Line management are alerted in all instances where high risks of loss of knowledge are prevalent for them to take appropriate mitigating action, which should include development and implementation of knowledge retention plans. These plans outlines the knowledge at risk, identifies successors and requires timelines for the transfer of knowledge to successors.

In addition to the above process, management is also required to complete an extensive tacit knowledge questionnaire in all instances of high risks of loss of knowledge. This questionnaire seeks to codify tacit knowledge that does not reside anywhere in procedures and work instructions.



Necsa Library services

Library Services

The function is responsible for the management of the Necsa Library and all the associated processes. It also serves as a point of liaison for fraternal organisations such as the National Library, university libraries, etc. and provides for inter-library loans with those bodies. The Necsa Library also serves as the central distribution hub for newspapers as well as engineering and scientific articles. The Necsa Chief Librarian is the designated International Nuclear Information System (INIS) Liaison Officer for South Africa at the IAEA with the responsibilities of updating the INIS system with relevant nuclear information emanating from this country.

Table 32: Inter-library loans	
Necsa employees	113
Requests received from other libraries	43
Request sent to other libraries	23

**Majority of our service users are the Necsa Learning Academy students*

Document Management & Archiving Services

This function is responsible for all archiving and document management within the Necsa Group, in compliance to the business requirements of security of archived documents and retention of all material.

7.3 EMPLOYMENT STATISTICS

Necsa Group staff composition for the year ended 31 March 2022

Necsa Group's total staff complement inclusive of contract workers and employees of AEC Amersham as at 31 March 2022 was 1775 as compared to 1825 reported for the comparative period of March 2021. Of this total, 16 is contract employees, while the remaining 1759 is permanent employees. This information is depicted in Table 33 below which reflects the distribution in terms of race and gender.

Table 33: Necsa Group's total staff complement						
Row els	A - African	C - Coloured	I - Indian	W - White	Subtotal	Grand Total
	Males Females	Males Females	Males Females	Males Females	Males Females	
Top management	62	0	2		82	10
Senior management	1 210	2	3	132	3 012	42
Middle management	11 151	42	117	6 636	19 296	288
Skilled	258 216	136	511	14 271	418 304	722
Semi-skilled	308 141	176	11	3 617	362 165	527
Unskilled	7 494			2	7 496	170
Contract worker	55	2	1	12	79	16
Grand Total	**774 519**	**3616**	**2319**	**258 130**	**1 091 684**	**1 775**

7.4 REMUNERATION

The Necsa treats remuneration as a strategic tool through which it competes for talent while at the same time aligning its staff to the organisational culture of promoting and rewarding high performance, and thereby ensuring sustainability of the business. The Necsa pays all its employees a guaranteed package based on the total cost to company principles. The remuneration practice of the organisation in line with the guidelines of the Department of Public Services and Administration for SOEs.

The Necsa, therefore, sees it as a business imperative the need to maintain fair and competitive remuneration consistent with sector practices and all necessary regulations and Collective Bargaining Agreement governing employees. Since the organisation is highly unionised, salary adjustment of employees falling within the Bargaining Unit are determined through collective bargaining while that of senior management and executives are falling within the purview of Board Social and Ethics Committee.

Adjustments to the remuneration of Executive Directors are recommended by the Social and Ethics Committee and are approved by the Board of Directors. For the reporting period, Executive Directors have not received any adjustment to their remuneration. Director's emolument is disclosed under Note 44 in the Financial Statements.

7.5 LABOUR RELATIONS

In 2021, a second three year collective agreement was concluded between the Necsa Group and organised laour in relation to the terms and condition of employment following the expiry of the three year agreement concluded in 2018. The successful conclusion of a new three-year agreement is significant achievement and stand as testimony to the maturity of the relationship that exist between the organisation and organised labour as one of its key stakeholders.

It is also vital to point out the agreement was actually concluded against the backdrop of the third year of previous collective agreement not having been implemented insofar as monetary aspect of the agreement. This was due to the Necsa group's financial position thus the clause was renegotiated. This was undoubtedly a huge sacrifice on the part of labour for the sake of social good and a huge victory for the collective wisdom and pragmatism which had significant impact to course for containing the wage bill.

7.6 DIVERSITY MANAGEMENT

The Necsa Group as a committed employer believes that a more diverse workforce results in greater innovation and value creation for the organisation.

The organisation has a three-year Employment Equity Plan (2020-2023) that incorporates goals and targets as required by the Employment Equity Act (EE Act, Act 55 of 1998). Whilst the Group Executive is accountable for the implementation of EE, the organisation has established an EE Forum that ensures that there is monitoring and evaluation of EE in the organisation. Furthermore, two executives have been appointed with full delegated authority to monitor and implement the EE Plan.

Table 34 below depicts the composition of the Necsa Group's permanent staff per race and gender. Evidence from the table is that males of all races constitute 61.8%, while females of all races are 38.2%. In terms of gender, the Group is predominantly males while African and coloured females are the under-represented group. Representation of African females at 28.9% is of great concern as this fact has a negative impact on the management control element of the Broad-Based Black Economic Empowerment (BBBEE) scorecard, requiring that skills development and the recruitment process be aligned with the EE targets as outlined in the EE Plan.

Table: 34 National economically active population vs Necsa Group workforce

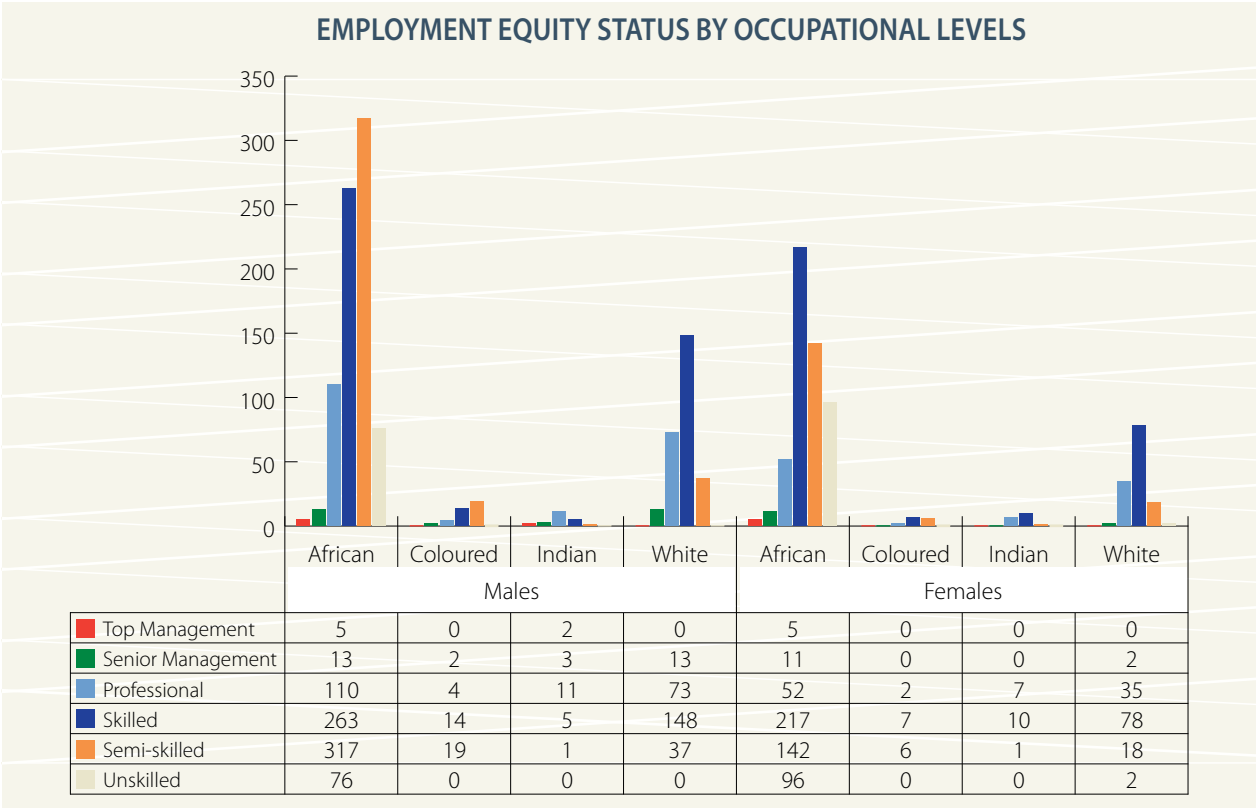
Males	EAP	Workforce status	Females	EAP	Workforce status
African	42.8%	43,4%	African	36%	28,9%
Coloured	5.2%	2.2%	Coloured	4.4%	0.8%
Indian	1.7%	1.2%	Indian	1.0%	1%
White	5.1%	15%	White	3.9%	7.5%
Total males	54.8%	61.8%	Total females	48.3%	38.2%
*This data excludes foreign nationals as no EAP targets are allocated for the group					

Table 35: Analysis People with Disabilities (PWDs)

Years	2015	2020	2022
All employees	2122	1821	1850
Target	42	36	37
All PWDs	25	25	22
% from target	-41%	-39,55	-59%
Shortfall	17	11	15
% current status	1.18%	1.37%	1.2%

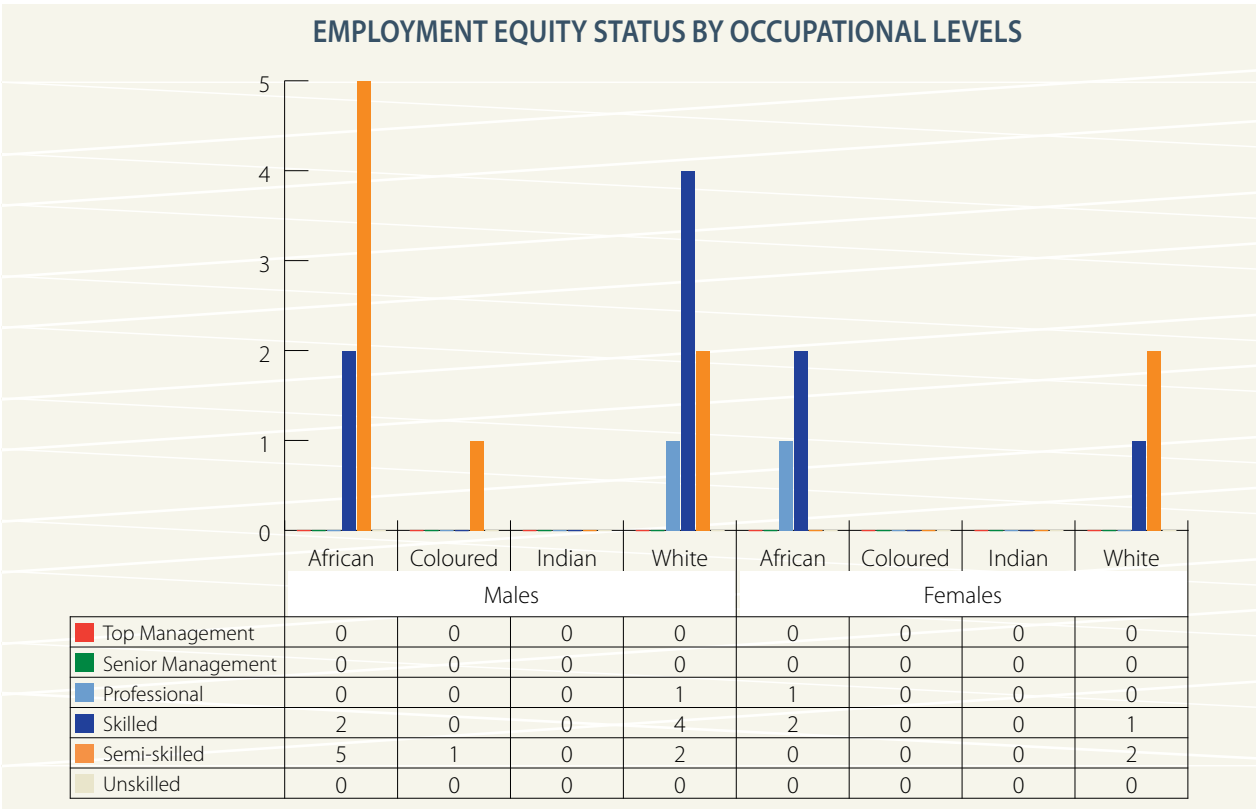
The recruitment moratorium has restrained upward movement of the PWD numbers within the Necsa Group. Strategies are developed to proactively implement affirmative action measures to include PWDs in the workplace with more rigour.

Chart 4: Employment Equity statistics (Representing all employees)



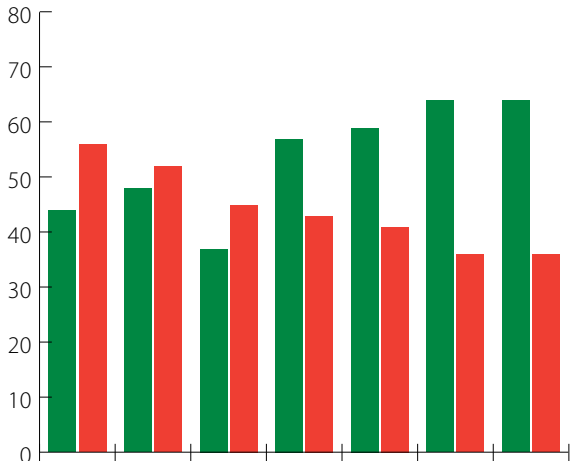
	Males				Females			
	African	Coloured	Indian	White	African	Coloured	Indian	White
Top Management	5	0	2	0	5	0	0	0
Senior Management	13	2	3	13	11	0	0	2
Professional	110	4	11	73	52	2	7	35
Skilled	263	14	5	148	217	7	10	78
Semi-skilled	317	19	1	37	142	6	1	18
Unskilled	76	0	0	0	96	0	0	2

Chart 5: Employment Equity statistics (Employees living with disabilities)



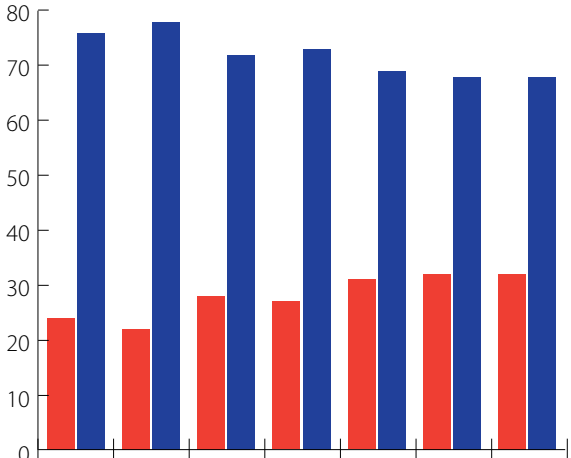
	Males				Females			
	African	Coloured	Indian	White	African	Coloured	Indian	White
Top Management	0	0	0	0	0	0	0	0
Senior Management	0	0	0	0	0	0	0	0
Professional	0	0	0	1	1	0	0	0
Skilled	2	0	0	4	2	0	0	1
Semi-skilled	5	1	0	2	0	0	0	2
Unskilled	0	0	0	0	0	0	0	0

HEADCOUNT ≥D3 (RACE)



	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22 March
Black*	44%	48%	37%	57%	59%	64%	64%
White	56%	52%	45%	43%	41%	36%	36%
Headcount (Black)	71	76	57	81	80	88	85
Headcount (White)	90	81	70	60	56	49	47

HEADCOUNT ≥D3 (GENDER)



	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22 March
Female	24%	22%	28%	27%	31%	32%	32%
Male	76%	78%	72%	73%	69%	68%	68%
Headcount (Female)	39	34	43	41	42	44	41
Headcount (Male)	122	123	113	113	94	93	88

On senior management level, race transformation reflects a positive trend since 2018. Our goal is that the demographic transformation on all levels should reflect the demographics of Gauteng (this is the area we operate in and most HR talent get sourced from Gauteng).

The Necsa's gender transformation is lagging behind and we have set recruitment and development targets to accelerate gender transformation. Recruitment targets have been set to ensure that at least 75% of all new recruits are Black.

Chart 6: Headcount (Race & Gender)

*Black" includes African, Coloured and Indian

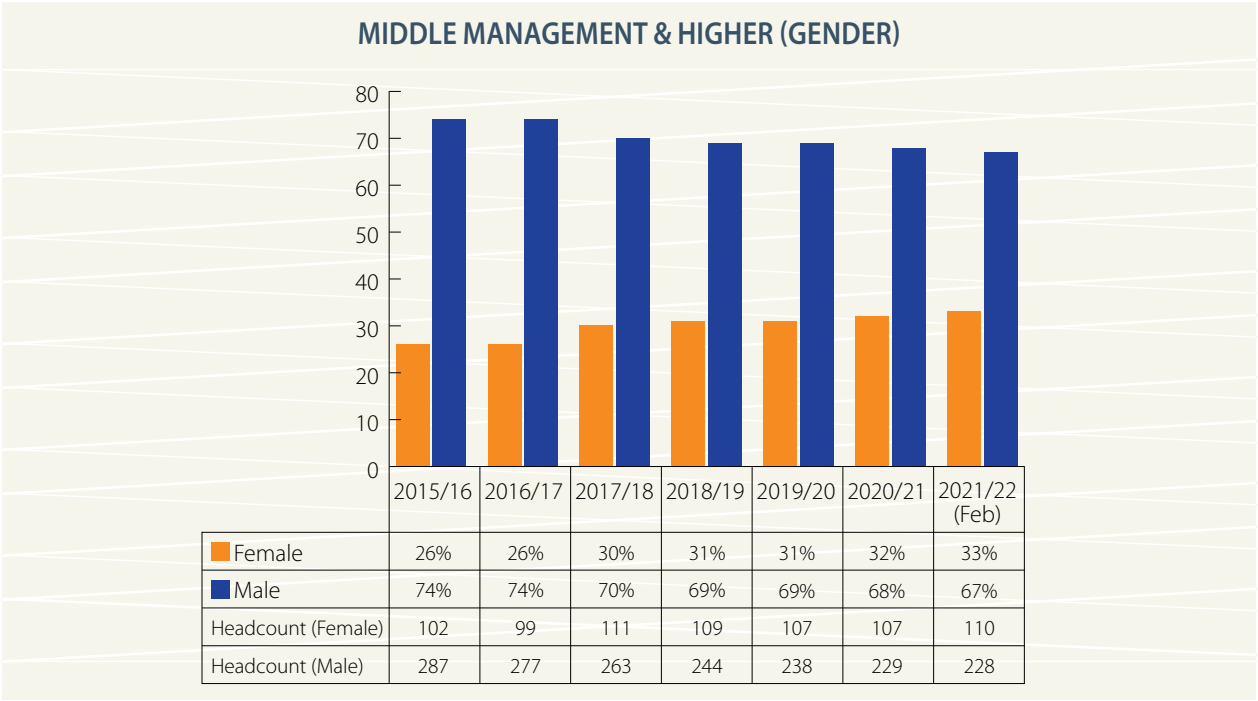
7.7 TRANSFORMATION MANAGEMENT

Objective: To achieve Necsa Group's targets for transformation, social, and economic responsibility by promoting a culture of compliance.

Table 36: The Necsa Group's targets for transformation, social, and economic responsibility				
Measurable - What are the standards or parameters?	**What is the time bound & related targets**			
	Current Status	**Year 2**	**Year 4**	**Year 6**
Increase in culture index	3.4	3.5	4.0	4.1

Table 37: Increase of Black females in middle management positions (≥D1) and higher				
Measurable - What are the standards or parameters?	**What is the time bound & related targets**			
	Baseline	**Year 1**	**Year 3**	**Year 5**
Percentage increase of Black females in middle management positions (≥D1) and higher from March 2020 baseline	32 %	35 %	40 %	48 %

Chart 7: Middle management & higher



	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22 (Feb)
Female	26%	26%	30%	31%	31%	32%	33%
Male	74%	74%	70%	69%	69%	68%	67%
Headcount (Female)	102	99	111	109	107	107	110
Headcount (Male)	287	277	263	244	238	229	228

Although the ratio of males to females remains skewed with males being significantly high, the trend reflects positive upward tick with the percentage of females increasing gradually from 26 % back in 2015/16 to 33 % in 2021/22

To demonstrate commitment to addressing female representation at this level we need to contract with divisions on EE (transformation target). Include a transformation element in the scorecard, e.g. 60 % female appointment target at this level.

Note this charts shows Black vs White females in middle management.

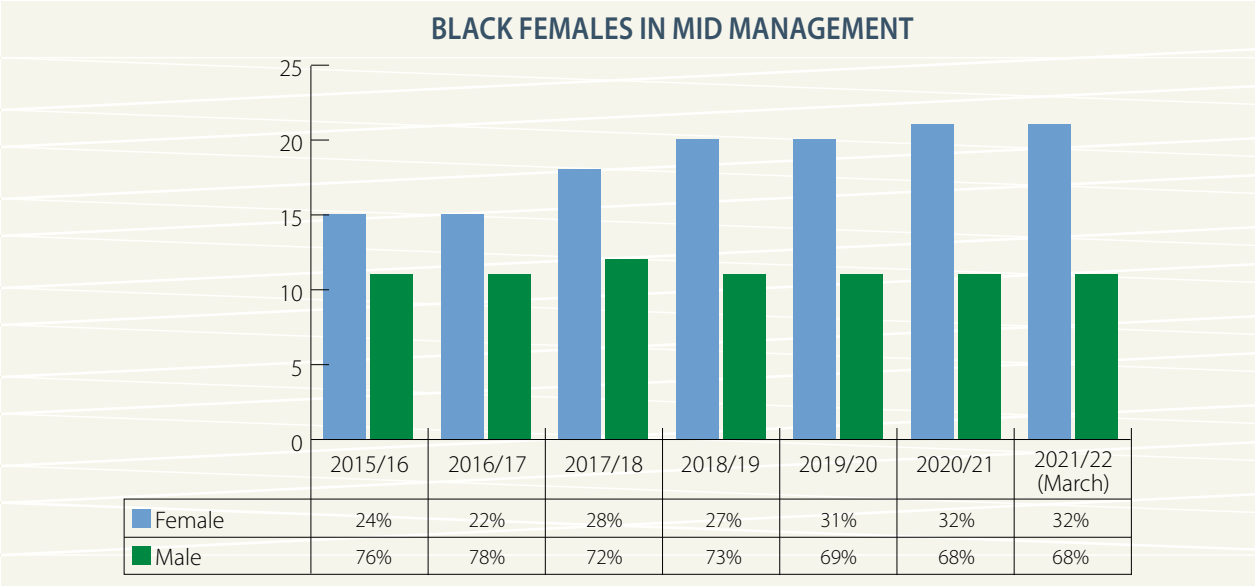


Chart 8: Black females in middle management

Chart 8 below depicts the composition of the Necsa Group's permanent staff per race and gender. Evidenced from the chart is that males constitute 62.1%, while females of all races is 37.9%. In terms of race, the Group is reasonably transformed with Blacks constituting 76.8% while Whites constitute 23.2% of the staffing compliment for the Group.

7.8 STAFF DEVELOPMENT

Technical skills training

The Necsa Learning Academy (NLA) continues to fulfil its mandate in response to the national youth development imperative to ensure that the skills imparted to the unemployed youth ensures that they are employable. The apprenticeship programme trained **124** unemployed youth in the reporting year. The NLA entered into two strategic partnerships programmes to develop and qualify unemployed youth as artisan with the National Skills Fund (NSF) and the Gauteng Technical Manufacturing Initiative (GTMI).

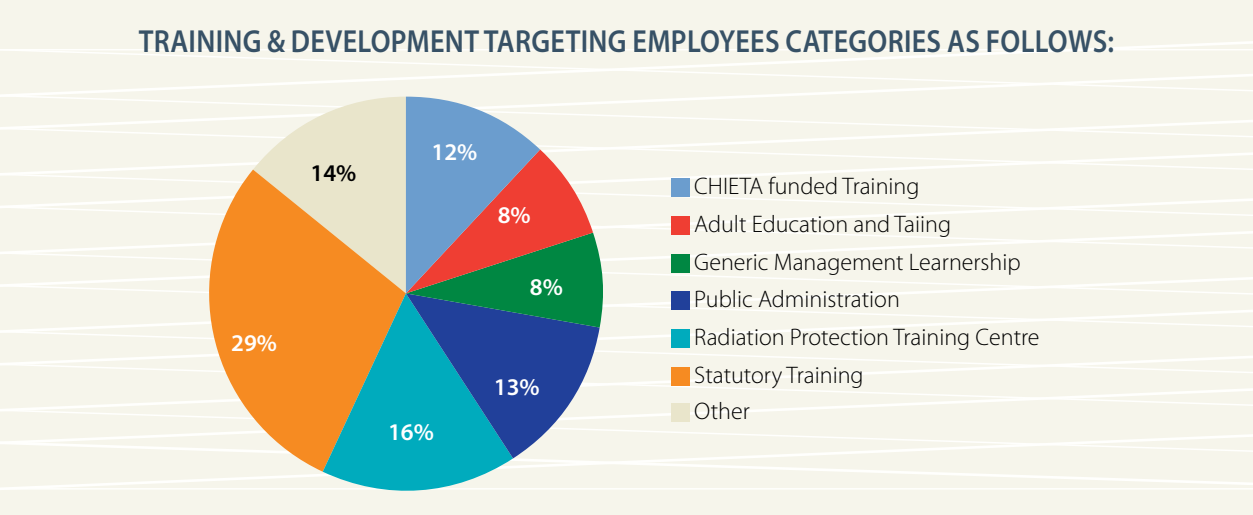
Necsa Learning Academy (NLA)

The NSF funded their second Artisan Development Programme: Project 2, which was implemented successfully with a 98% throughput. Out of 56 learners recruited, 54 completed trade test and qualified as artisans. The GTMI Artisan Development Programme, which is still ongoing, is training 69 learners who are doing their On-the-Job training as part of their curriculum. They are expected to complete their training in the next financial year.

Trade Test Centre (TTC)

The TTC continued to offer trade testing and associated services, pre-assessments for artisan Recognition of Prior Learning for **28** candidates, gap training for **35** candidates, trade test preparation for **155** candidates and trade testing for **170** candidates.

Human Capital Development (HCD)



CHIETA-funded Work Integrated Learning (WIL)

The WIL-funded by CHIETA has been finalised and the students were on-site at different divisions.

The **table 38** below provides details.

Table 38: CHIETA-funded WIL

Discipline	April 2021 to March 2022				
	Black		Coloured		
	M	F	M	F	Total
Nation Diploma in Industrial Physics	0	1	0	0	1
B-Tech degree in HRD	0	1	0	0	1
Bachelor of Commerce	1	2	0	0	3
Diploma in HRM	0	3	0	0	3
Diploma in Financial Management	6	12	0	0	18
Diploma in Chemical Engineering	0	1	0	0	1
Degree in Chemical Engineering	0	1	0	0	1
Total	**7**	**21**	**0**	**0**	**28**

Adult Education and Training (AET)

The AET started in February 2022 with level 2, 3 and 4. A total number of 18 Group Necsa employees attended the AET Learnership as per the **table 39 below**:

Table 39: AET Training – April 2021 to March 2022								
Discipline	Gender		Race				Total	
	M	F	B	C	I	W		
AET Training	7	11	18	0	0	0	18	R90 000.00
Total	**7**	**11**	**18**	**0**	**0**	**0**	**18**	**R90 000.00**

Learnership: National Certificate in Generic Management Learnership NQF Level 5

A total number of 20 Necsa Group employees are participating in the Generic Management Learnership NQF 5. Training commenced in the reporting year and will be completed in November 2022. The breakdown of employees is shown in the **table 40 below**:

Table 40: National Certificate in Generic Management Learnership - NQF Level 5								Total Amount
Discipline	Gender		Race				Total	
	M	F	B	C	I	W		
Generic Management Learnership – NQF Level 5	9	11	19	0	0	1	20	R360 000.00
Total	**9**	**11**	**19**	**0**	**0**	**1**	**20**	**R360 000.00**

Learnership for National Certificate in Public Administration –NQF Level 5

A total number of 10 Necsa Group employees are participating in the Learnership for National Certificate in Public Administration NQF 5. Training commenced in the reporting year and will be completed in December 2022. The breakdown of employees is shown as per the **table 41 below**:

Table 41: National Certificate in Public Administration - NQF Level 5								Total Amount
Discipline	Gender		Race				Total	
	M	F	B	C	I	W		
National Certificate in Public Administration – NQF Level 5	4	6	10	0	0	0	10	R 180 000.00
Total	**4**	**6**	**10**	**0**	**0**	**0**	**10**	**R180 000.00**

Learnership for National Diploma in Public Administration –NQF Level 6

A total number of 20 Necsa Group employees are participating in the Learnership for National Diploma in Public Administration NQF 6. Training commenced in the reporting year and will be completed in December 2022. The breakdown of employees is shown as per the **table 42 below**:

Table 42: National Diploma in Public Administration - NQF Level 6								Total Amount
Discipline	Gender		Race				Total	
	M	F	B	C	I	W		
National Diploma in Public Administration – NQF Level 6	10	10	19	0	0	1	20	R360 000.00
Total	**10**	**10**	**19**	**0**	**0**	**1**	**20**	**R360 000.00**

Study Assistance Scheme

A total amount of R718 532.59 was spent on the Study Assistance Scheme (SAS) for the reporting period to assist 33 Necsa Group employees to obtain qualifications at various institutions of higher learning throughout South Africa. The **table 43 below** illustrates the various programmes undertaken by the employees:

Table 43: Various programmes undertaken by the employees									
Discipline	Black		Coloured		Indian		White		Amount
	Male	Female	Male	Female	Male	Female	Male	Female	
B A Degree	0	1	0	0	0	0	0	0	R90 243,10
B Com	1	4	0	0	0	0	0	0	R58 517,00
B Tech Degree	1	2	0	0	0	0	0	0	R25 972,31
BSc	0	1	0	0	0	0	0	0	R14 130,00

Table 43: Various programmes undertaken by the employees									
Discipline	Black		Coloured		Indian		White		Amount
	Male	Female	Male	Female	Male	Female	Male	Female	
LLB	0	1	0	0	0	0	0	0	R11 655,00
M Tech	1	0	0	0	0	0	0	0	R3 000,00
Masters	2	1	0	1	0	0	0	0	R90 119,73
MBA	0	2	0	0	0	0	0	0	R112 900,00
MSc	1	0	0	0	0	0	0	0	R25 135,67
National Diploma	4	6	0	0	0	0	0	0	R207 809,78
PHD	2	1	0	0	0	0	0	1	R79 050,00
Total	**12**	**19**	**0**	**1**	**0**	**0**	**0**	**1**	**R718 532,59**

Radiation Protection Training Centre (RPTC)

The RPTC trained unemployed youth, supervised the thesis of MSc and PhD students and offered radiation safety courses as per the **table 44 below**:

Table 44: Radiation Protection Training							
Training area	Gender		Race				Total
	M	F	B	C	I	W	
RPO1	7	3	4	0	0	6	10
RPO2	8	12	2 0	0	0	0	20
Radiation Safety Course	4	0	3	0	0	1	4
MSc	0	1	1	0	0	0	1
PhD	2	1	3	0	0	0	3
Total	**21**	**17**	**31**	**0**	**0**	**7**	**38**

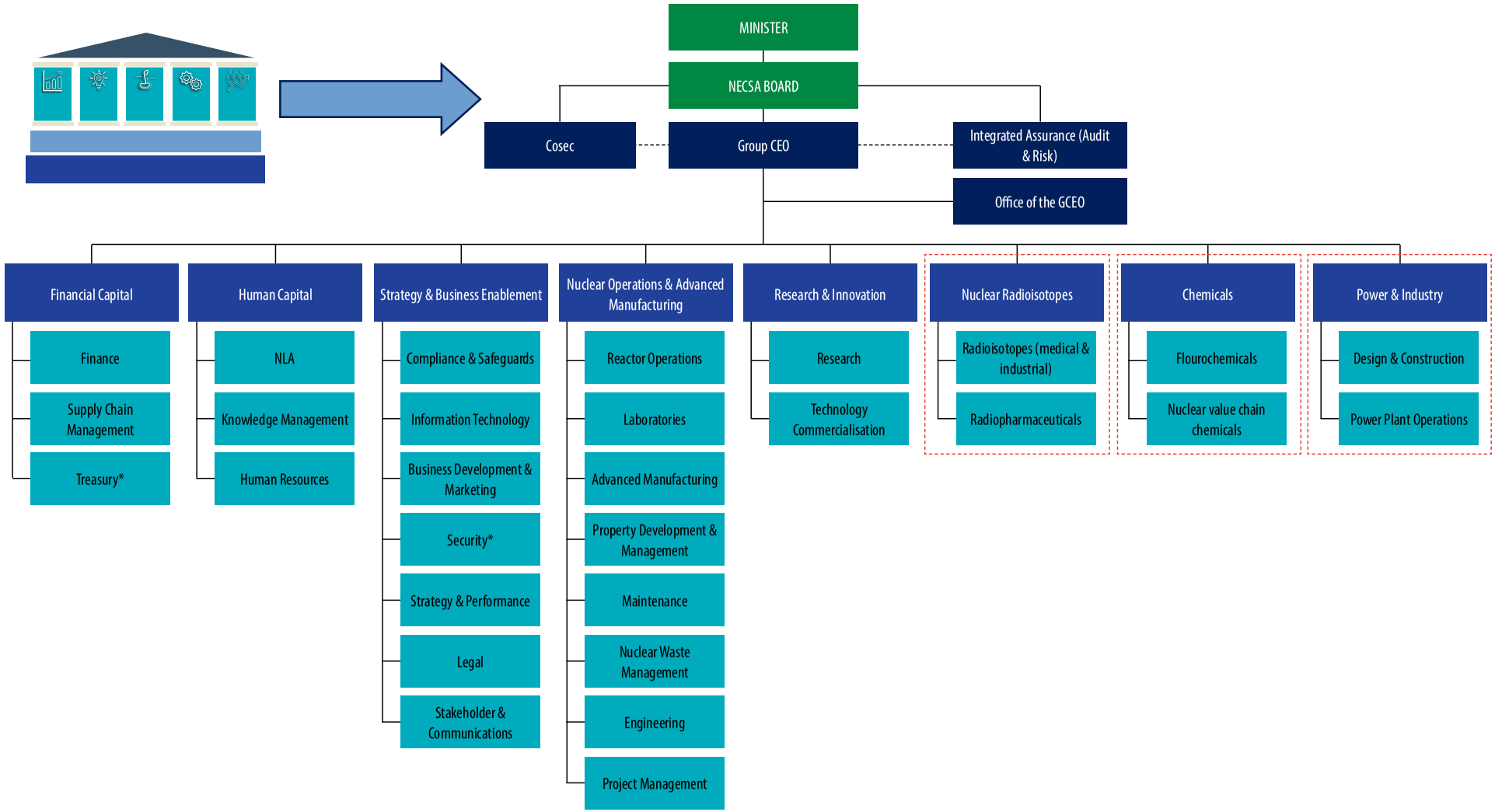
Statutory training

Statutory training for the Necsa Group employees during the reporting year was offered as per the **table 45 below**:

Table 45: Radiation Protection Training								
Course	Black		Coloured		Indian		White	
	Male	Female	Male	Female	Male	Female	Male	Female
Chemical Worker Full Course	38	41	1	1	0	1	2	1
Chemical Worker Exam	175	89	17	3	1	0	71	16
Confined Spaces Full Course	7	0	0	0	0	0	2	0
Confined Spaces Exam	18	6	0	0	0	0	3	0
Decontamination Worker Full Course	7	4	0	0	0	0	0	0
Decontamination Worker Exam	16	0	1	0	0	0	2	0
Laser Worker Exam	1	0	0	0	0	0	0	0
Lock Out Tag Out Exam	7	2	0	0	0	0	1	0
Noise Worker Full Course	30	31	1	1	0	0	1	0
Noise Worker Exam	220	64	20	3	3	0	102	13
Necsa Orientation	132	69	4	0	1	4	39	8
Contractor Orientation	63	27	9	2	1	1	22	2
Radiation Worker Full Course	50	43	2	0	1	1	4	4
Radiation Worker Exam	266	103	6	1	3	1	101	20
Work Permit Full Course	7	2	1	0	0	0	7	2
Work Permit Exam	18	2	12	1	0	0	14	3
TOTAL	**1,055**	**483**	**74**	**12**	**10**	**8**	**370**	**69**

GOVERNANCE STRUCTURES

NECSA GROUP STRUCTURE



Level 1 blue blocks require Board approval to change

BOARD OF DIRECTORS

The Board of Directors is the Accounting Authority in terms of the Public Finance Management Act (PFMA, Act 1 of 1999, as amended) and is appointed for a renewable period of three years by the Minister of Mineral Resources and Energy. In terms of Section 16, the Necsa is governed and controlled, in accordance with the Nuclear Energy Act (1998), by a Board of Directors to ensure that the objectives of the Act are carried out, and to exercise general control over the performance of the Necsa's functions. The Board of Directors embrace the principles of good corporate governance and considers these as the underlying philosophy in creating organisational excellence at all levels within the Necsa.

The Board sets the precedence in driving ethics and good governance within the organization. Directors collectively and individually acknowledge their responsibilities and duties in terms of the Memorandum of incorporation and Board Charter, as well as other governance, regulatory and legislative requirements.

The Board is accountable for the overall formulation, monitoring and review of the Necsa's corporate strategy and related affairs, while delegating to management the responsibility for business performance and achievement of the organisation's objectives. The Board composition reflects the wide range of skills and knowledge necessary to meet the Necsa's strategic objectives.

Board Visit to Necsa Learning Academy

Details of Board Members

Board composition information of the Necsa is provided for the reporting period 1 April 2021 to 31 March 2022. For the period under review, the Board composition that will be categorised is with respect to the Board that was appointed on a three-year term effective from 17 January 2020 to 23 January 2023. In November 2021, the Minister of Mineral Resources and Energy appointed two additional Non-executive Directors onto the Board of Necsa. The two additional Non-executive Directors are representatives of the Department of International Relations and Cooperation. The appointment is consistent with the requirements of the Nuclear Energy Act (1998).

The Necsa Board comprised of 12 Non Executive Directors who were independently appointed by the Minister of Mineral Resources and Energy. In June 2021, the Board of Necsa appointed Ms. Fakazile Nyembe as the Group Company Secretary for the Necsa to provide an efficient secretariat service to the Board in line with restoring good governance in the organisation.

NECSA BOARD COMPOSITION

DR. Dr Magau NT, Mr Nicholls, Ms Chowan A

Ms Noge-Tungamirai L, Mr Shayi LJ

Prof Davids GJ, Ms Masango SKN

Mr Van Schalkwyk M (DIRCO Alternative representative), Ms Monale PE (DMRE Representative)

Ms Makgopa B (DMRE Alternate representative), Amb Ntshinga N N (DIRCO representative)

Mr Maboa MJ, Mr Tyabashe L

Details of Group Board Members

Directors Appointment effective 17 January 2020 to date

Surname & Initials	Gender	Race (African, Asian, Coloured and White)	Age	Skills, Knowledge and Experience Qualification	Terms of Board Appointment	Membership To Board Subcommittees and Subsidiary Boards Within Necsa	Active membership on the other organisations/companies/ Entities Boards
Mr Nicholls DR	Male	White	68	• BSc (Hons) in Mechanical Engineering (2-1), • Post Graduate Diploma in Nuclear Reactor Technology, Royal Naval College, Greenwich • Professional registered engineer (ECSA) • Chartered engineer in the UK	17 January 2020 to 16 January 2023	• Research, Development and Technology Committee • Business Development Committee • Structural Optimisation (Rationalisation) • Committee	• Carlswald Estate Home Owners Association • Chairperson of the Nuclear Research Chapter of the SAIEE • Co-Chairperson of the IAEA technical working group on nuclear power plant operations
Dr Magau NT	Female	Black	70	• D. Ed, Harvard University • M. Ed, Rand Afrikaans University • B. Ed, University of South Africa • BA, University of the North	17 January 2020 16 January 2023	• Chairperson of Human Resources and Social and Ethics Committee • Investment and Finance Committee • Structural Optimisation (Rationalisation) • Member of NTP Board of Directors	• Trustee of Bertha Gxowa Foundation • Dept of Water Izakhiwo Infundo Trust
Prof Davids GJ	Male	Coloured	62	• B.A Public Administration, University of Western Cape, • B.A. (Hon) Development • Management US • MPA US • PhD University of Western Cape • Certificate in International Finance and Economics (IIAP-France) • Program for Management Development (Harvard) • Governance for non-profit organisation (Harvard)	17 January 2020 16 January 2023	• Chairperson of Business Development Committee • Audit And Risk Committee • Human Resources and Social and Ethics Committee • Research, Development and Technology Committee	• Acting Deputy Director School of Governance (UWC) • Board member Overberg Water

Surname & Initials	Gender	Race (African, Asian, Coloured and White)	Age	Skills, Knowledge and Experience Qualification	Terms of Board Appointment	Membership To Board Subcommittees and Subsidiary Boards Within Necsa	Active membership on the other organisations/companies/ Entities Boards
Mr Maboa MJ	Male	Black	42	• Chartered Accountant • Registered Auditor • B.Com (Accounting), University: University of Cape Town • Postgraduate Diploma in Accounting • Advanced Certificate in Auditing	17 January 2020 16 January 2023	• Chairperson Structural Optimisation (Rationalisation) Committee • Chairperson Investment and Finance Committee • Business Development Committee	• Movundlela Consulting Pty Ltd- M Consulting Mashukudu James Maboa and Co Incorporated-MJM • Nehawu Investment Holdings (Pty) Ltd • Eyesizwe Mining Development Trust • Eyesizwe Mining (Pty) Ltd • Mashukudu James Maboa and Co Incorporated • UNISA Council • Bokone Gas Pty Ltd • Nehawu Lottery Investments
Mr Shayi LJ	Male	Black	63	• Master of Business Leadership, University of South Africa (UNISA) • Master of Science in Chemistry, University of Pretoria • BSc (Hons): Majors in Physical and Inorganic Chemistry, University of Natal • BSc: Majors in Chemistry and Physics, University of the North	17 January 2020 16 January 2023	• Chairperson of Nuclear Oversight and Regulatory Compliance Committee • Audit And Risk Committee • Human Resources and Social and Ethics Committee • Research, Development and Technology Committee • Member of Pelchem Board of Directors	n/a

Surname & Initials	Gender	Race (African, Asian, Coloured and White)	Age	Skills, Knowledge and Experience Qualification	Terms of Board Appointment	Membership To Board Subcommittees and Subsidiary Boards Within Necsa	Active membership on the other organisations/companies/ Entities Boards
Ms Masango SKN	Female	Black	35	• Masters in Nuclear Physics, University of the Western Cape • Hons in Nuclear Physics, University of Zululand • BSc Physics & Electronics (major in electronics), University of Zululand • Project Management Diploma, Varsity College • Certificate in Detector and Instrumentation Technology, Fermilab, USA • PGD n Energy Leadership, Wits Business school	17 January 2020 16 January 2023	• Chairperson Research, Development and Technology Committee • Nuclear Oversight and Regulatory Compliance Committee • Audit And Risk Committee • Human Resources and Social and Ethics Committee	Chairperson Senamile Masango Foundation
Ms Noge-Tungamirai L	Female	Black	40	• Master of Business Administration (MBA, Wits Business School) • Postgraduate Diploma in Management • Management Advancement Programme • Master Network Engineering Diploma, Torque-IT: • IT Programming Diploma, CTU Training Solutions	17 January 2020 16 January 2023	• Audit And Risk Committee • Research, Development and Technology Committee • Member of Pelchem Board of Directors • Nuclear oversight Committee • Business Development	• Member of the Institute of Directors (IoDSA) • Board Member Sticky BBQ Group • Board Member Empanda • Board Member Epion • Board Member Isimangaliso Wetland Park • Board Member Environmental Assessment Practioners Association • Board Member Mangosuthu University of Technology (MUT)

Surname & Initials	Gender	Race (African, Asian, Coloured and White)	Age	Skills, Knowledge and Experience Qualification	Terms of Board Appointment	Membership To Board Subcommittees and Subsidiary Boards Within Necsa	Active membership on the other organisations/companies/ Entities Boards
Adv Chowan A	Female	Indian	48	• CA(SA) Registered Auditor • Bachelor of Accountancy • Post Graduate Diploma in Accounting • LLB degree	17 January 2020 16 January 2023	• Chairperson of Audit And Risk Committee • Human Resources and Social and Ethics Committee • Investment and Finance Committee • Business Development Committee • Member of NTP Board of Directors	• Board and ARC Member at: • Council of GEO Science • CBRTA (Cross Boarder Road Transport Agency) • Communicare
Ms Monale PE DMRE Representative	Female	Black	58	• MSc in Applied Radiation • BSc Ed • Training Course on Physical Protection of Nuclear Material and facilities – (IAEA)	1 February 2020 31 January 2023	• Chairperson Structural Optimisation (Rationalisation) Committee • Nuclear Oversight and Regulatory Compliance	n/a
Ms Makgopa B Alt. to Ms Monale	Female	Black	46	• M. Sc Nuclear Engineering • B. Sc Honours Environmental Management • BSc Honours in Physics • BSc Physical Sciences • Programme in Project Management • Executive Leadership Development Programme	1 February 2020 31 January 2023	• Nuclear Oversight and Regulatory Compliance	Director: Tsebo Science and Technology Centre
Amb Ntsinga N N	Male	Black	65	• Master of Law	26 November 2021 25 November 2024	• Board Member	n/a
Mr Van Schalkwyk Alt. to Amb Ntshinga	Male	White	63	• BA Honours Degree in International Politics and Political Science • B Admin Degree in International Relations	26 November 2021 25 November 2024	• Board Member	n/a

Surname & Initials	Gender	Race (African, Asian, Coloured and White)	Age	Skills, Knowledge and Experience Qualification	Terms of Board Appointment	Membership To Board Subcommittees and Subsidiary Boards Within Necsa	Active membership on the other organisations/companies/ Entities Boards
Mr Tyabashe L	Male	Black	48	• Master of Science in Mechanical Engineering (MSc. Mech. Eng.) • Bachelor of Science in Mechanical Engineering (BSc. Mech. Eng.) • World Nuclear University Summer Institute • Executive Leadership Program (ELP • Nuclear Engineers Course, Eskom	01 January 2021 To date	• Chairperson of Pelchem Board of Directors • Chairperson of NTP Board of Directors • Ex-Officio on Committees of the Board	• Consolidated Plant Solutions • Constellation Investment Corporation

Board Charter

The Nuclear Energy Act 1998 and Board Protocol are the cornerstone of the Necsa Board Charter. They regulate the Board in accordance with the principles of good corporate governance and set out the specific duties and responsibilities to be discharged by the Board as a unitary working group. The Board charter ensures that all Board members, acting on behalf of the Authority, are aware of the legislation and regulations affecting their conduct and that the principles of good corporate governance are applied in all their dealings with respect to and on behalf of the Necsa.

Meetings of the Board

The Nuclear Energy Act (1998) requires that the Board meets at least four times per annum to discuss and review the Strategy and Business Plan. Special Board meetings are convened, when necessary, to deliberate on issues that require Board resolutions between scheduled meetings. Members of management are periodically invited to make presentations on issues of particular interest to the Board.

Meetings of the Board for the financial reporting: Member Details	29 May.	28 Jun.	25 Aug.	30 Aug.	15 Oct.	30 Nov.	25 Jan.	28 Feb.	2 Mar.	23 Mar.
Mr Nicholls DR	P	P	P	P	P	P	P	P	P	P
Dr Magau NT	P	P	P	P	P	P	P	P	P	P
Prof Davids GJ	P	P	P	P	P	P	P	P	P	P
Mr Maboa MJ	P	A	P	P	P	P	P	A	A	P
Mr Shayi LJ	P	P	P	P	P	P	P	P	P	P
Ms Masango SKN	P	P	P	P	P	P	P	P	P	P
Ms Noge-Tungamirai L	P	P	P	P	P	P	P	P	P	P
Adv Chowan A	P	P	P	P	P	P	P	P	P	P
Ms Monale PE	A	P	P	P	P	P	P	A	A	A
Ms Makgopa B	A	A	P	P	P	P	P	A	A	A
AMB Ntshinga NN	N	N	N	N	N	N	A	A	A	A
Mr Van Schalkwyk M	N	N	N	N	N	N	P	P	P	P
Mr Tyabashe L	P	P	P	P	P	P	P	P	P	P

P Member present at the meeting

A Member not present, but tendered an apology

T Member participated via Telecon

N Member not appointed at this stage

Committees of the board

The Board has continued to improve its effectiveness and quality of governance. This is evidenced by revision of the number of board subcommittees from two subcomittees to seven, inclusive of the two statutory committees, the Audit and Risk Committee and the Human Resources, Social and Ethics Committee. The Necsa Board has also developed and approved the corporation's strategy and plan to ensure alignment with the business and mandate of the Necsa.

The Board was advised and assisted by seven Board Committees, i.e., the Audit and Risk, Social and Ethics, Research, Development and Technology, Investment and Finance, Business Development, Structural Optimisation and Nuclear Oversight and Compliance committee. The Board Committees met at least once per quarter and all the Committees have adopted formal terms of reference (TOR) and provide the required feedback to the Board through Committee reports. Board Committees and TOR are reviewed annually to ensure continuous relevance.

In terms of Section 19 of the Nuclear Energy Act (1998), the Board is advised and assisted by advisory committees, whose mandate is to assist the Board in discharging its responsibilities. These committees play an important role in enhancing high standards of governance and improving effectiveness within the Necsa Group. External advisors are invited to attend Board and/or committee meetings on an ***ad hoc*** basis, as or when the need arises.

Audit and Risk Committee

The Audit Committee plays a key role in assisting the board to fulfil its oversight responsibilities in areas such as an entity's financial reporting, internal control systems, risk management systems and the internal and external audit functions.

Members of the Committee are:

- Adv. A Chowan (Chairperson)
- Ms. L Noge-Tungamirai
- Ms. S K N Masango
- Mr. LJ Shayi
- Prof. GJ Davids

Meetings held for the reporting report were as follows:

Members						
	27 May.	17 Jun.	28 Jun.	12 Oct.	27 Nov.	23 Feb.
Adv. A Chowan (Chairperson)	P	P	P	P	P	P
Ms. L Noge-Tungamirai	P	P	P	P	P	A
Ms. S K N Masango	p	P	P	P	P	P
Mr. LJ Shayi	P	P	P	P	P	P
Prof. GJ Davids	P	P	P	P	P	P

Social and Ethics Committee

This Committee was formally constituted in line with the provisions of regulation 43(5) read with section 72(4)-(10) of the Companies Act (Act 71 of 2008). The role of the SEC is to assist the Board with the oversight of social and ethical matters relating to the company.

Members of the Committee are:

- Dr. N T Magau (Chairperson)
- Prof. G J Davids
- Mr. L J Shayi
- Adv. A Chowan
- Ms S K N Masango

Meetings of the Committee for financial reporting:

Members	Meeting dates For the period April 2021 – March 2022					
	20 May.	16 Aug.	15 Nov.	16 Feb.		
Dr. NT Magau (Chairperson)	P	P	P	P		
Prof. G J Davids	P	P	P	P		
Mr. L J Shayi	p	P	P	P		
Adv. A Chowan	P	P	P	P		
Ms S K N Masango	P	P	P	P		

P Member present at the meeting

A Member not present, but tendered an apology

Investment and Finance Committee

The purpose of the Investment and Finance Committee is to assist the Board in fulfilling its obligations by receiving reports, deliberating and/or making recommendations to the Board on matters investment policies, reviewing the viability of business opportunities and/or cases, reviewing the Necsa Group's financial performance, procedures to monitor the application of and compliance with the investment policies by officers, employees and the Necsa's Investment Board's agents, approval of all other investment transactions, the effectiveness of the investment policies and the achievement of the objects of the Necsa Board, considering and recommendation for approval by the Necsa Board, the Necsa Group Corporate Plan, and such other matters as may be delegated to the Committee by the Board.

Members appointed are:

- Mr. M J Maboa (Chairperson)
- Dr. N T Magau
- Adv. A Chowan
- Ms. S K N Masango

Meeting of the Committee for the financial reporting:

Members	Meeting Dates For the period April 2021 – March 2022					
	19 May.	14 Jun.	17 Aug.	19 Nov.	27 Jan	11 Feb
Mr. M J Maboa (Chairperson)	P	P	P	P	P	P
Dr. N T Magau	P	P	P	P	P	P
Adv. A Chowan	P	P	P	P	P	P
Ms. S K N Masango	P	P	P	P	P	P

Research, Development & Technology Committee (R&DT)

The objective of the Committee is to assist the Board in providing assurance to the shareholders and/or stakeholders of Necsa that technology, research and development matters of the company are strategic, innovative, and supported at the highest level.

Members appointed are:

- Ms. S K N Masango (Chairperson)
- Mr. L J Shayi
- Mr. D R Nicholls

- Prof. G J Davids
- Ms. L Noge-Tungamirai

Meeting of the Committee for the financial reporting:

Members	Meeting dates For the period April 2021 – March 2022							
	21 May.	20 Aug.	23 Aug	20 Nov.	14 Feb			
Ms. SKN Masango (Chairperson)	P	P	P	P	P			
Mr. L J Shayi	P	P	P	P	P			
Mr. D R Nicholls	P	P	P	P	P			
Prof. G J Davids	P	P	P	P	P			
Ms L Noge- Tungamirai	P	P	P	A	P			

Business Development Committee

The objective of the committee is to review and oversee the development and implementation of the company's growth strategies and make recommendations to the Board.

The members of the committee are:

- Prof. G J Davids (Chairperson)
- Mr. D R Nicholls
- Adv.Chowan
- Mr. M J Maboa
- Ms. L Noge-Tungamirai

Meeting of the Committee for the financial reporting:

Members	Meeting dates For the period April 2021 – March 2022			
	19 May.	18 Aug.	15 Feb	
Prof G J Davids (Chairperson)	P	P	P	
Adv A Chowan	P	P	P	
Mr. D R Nicholls	A	P	A	
Mr. M J Maboa	P	P	P	
Ms. L Noge-Tungamirai	P	P	P	

Nuclear Oversight and Regulatory Compliance Committee

The purpose of the Committee is to advise and assist the Board in fulfilling its responsibilities to oversee the safety and reliability of the company's nuclear facilities, with principal focus on safety and compliance.

Members appointed are:

- Mr. L J Shayi (Chairperson)
- Ms. S K N Masango
- Ms. L Noge-Tungamirai
- Ms. PE Monale
- Ms B Makgopa – alternate member

Meeting of the Committee for the financial reporting:

Members	Meeting dates For the period April 2021 – March 2022			
	18 May.	17 Aug.	18 Nov	17 Feb
Mr. L J Shayi (Chairperson)	P	P	P	P
Ms. S K N Masango	P	P	P	P
Ms. L Noge-Tungamirai	P	P	P	P
Ms. P E Monale	P	P	P	P
Ms. B Makgopa	P	P	A	A

Board Structural Optimisation Committee

This is an interim Board Committee appointed to oversee the restructuring and repurposing of the Necsa Group.

Members appointed are:

- Mr. M J Maboa (Chairperson)
- Dr. N T Magau
- Ms. P E Monale
- Mr. D R Nicholls

Members	Meeting dates For the period April 2021 – March 2022			
	24 May.	29 Jun.	31 Jul.	11 Apr
Mr. M J Maboa (Chairperson)	P	P	P	P
Dr. N T Magau	P	P	P	P
Ms. P E Monale	P	P	P	A
Mr. D R Nicholls	P	P	P	P

Composition of members of the Executive Management

In terms of Sections 22 and 23 of the Nuclear Energy Act (1998), the GCEO has the power and authority, among other things, to implement approved business plans, annual budgets, all other issues and matters relating to the achievement of the Necsa's goals including preparation, review and recommendation to the Board of the annual budgets and any amendments thereto. The GCEO, in carrying out the powers set out above, is assisted by the Executive Management Committee. The GCEO acts as the Chairperson of the Group EXCO. The Committee's main functions include alignment of the Necsa's business with the Group's mission, vision, strategies, targets, policies and consideration of material business, strategic, financial and functional issues.

One of the key objectives of the rationalisation process is to ensure that the GCEO has sufficient capacity to effectively lead the organisation in the right direction. The group structure operates in a manner that ensures that all subsidiaries are effectively supported by the group as well as the appropriate governance to ensure effective execution of the strategy. Subsequent to the approval of the new organisational structure, the GCEO appointed the following executives to execute the mandate from the Board:

1) Mr Ayanda Myoli – Group Executive Nuclear Manufacturing and Advancement
2) Ms Qhamkile Boyede – Group Executive Strategy and Business enablement
3) Ms Precious Hawadi – Financial Capital
4) Mr Pradish Rampersadh –Group Executive Research and Innovation
5) Mr Monde Mondi – Group Executive Human Capital
6) Ms Nto Rikhotso – Executive in the Office of the Group Chief Executive

Group EXCO

EXCO members until 31 December 2021

Mr L Tyabashe (Necsa Group Chief Executive Officer), Ms H Khumalo (Chief Financial Officer), Mr T Tselane (Acting NTP Group MD) , Mr I Radebe (Pelchem MD)

Ms M Jantjie (Acting Chief Legal Advisor), Mr JF du Bruyn (Acting Chief Technology Officer), Mr R Ramatsui (Group Executive Pelindaba Enterprises), Mr Petrus J Schutte (Pelchem Chief Financial Officer)

Ms M Rasweswe (Group Executive Nuclear Compliances and Services), Mr Z Ismail (Acting Chief Audit Officer), Prof Dr JR Zeevaart (Acting Divisional Executive), Mr F Mkhabela (Chif Risk Officer)

Current Group EXCO Members

Mr L Tyabashe (Necsa Group Chief Executive Officer), Mr T Tselane (NTP Group MD), Ms P Hawadi (Financial Capital)

Fakazile Nyembe (Company Secretary), Mr AB Myoli (Group Executive: Nuclear Operations & Advanced Manufacuring), Mr U Natha (MD: Pelchem)

Laura Mabunda (Head of Integrated Assurance), Mr M Mondi (Group Executive: Human Capital Management), Mxolisi Makhathini (Group Executive: Power and Industry)

Ms N Tengimfene (General Manager: Corporate Communication & Stakeholder Relations), Ms Q Boyede (Strategy and Business Enablement), Mr P Rampersadh (Group Executive -Research and Innovation), Ms N Rikhotso (Office of the GCEO Executive)

The members of the Executive Management Committee (EXCO) are:

Name	Capacity	Appointed date	Qualifications
Mr L Tyabashe	Necsa Group CEO	1 January 2021	• MSc Mech Eng • BSc Mech Eng • World Nuclear University Summer Institute • Executive Leadership Program (ELP) • Nuclear Engineers Course, Eskom
Mr T Tselane	Acting NTP Group MD NTP Managing Director	1 February 2021 – 28 Feb 2022 1 March 2022	• M.Sc (Applied Nuclear Physics • B.Sc (Honours Nuclear Physics) • B.Sc (Chemistry and Physics) • Project Management • Senior Management Programme • Global Executive Development Programme - (Gibs)
Mr I Radebe	Pelchem MD Acting CEO: Ketlaphela SOC Ltd	November 2016 – October 2021 Nov 2021 – April 2022	• National Diploma, Electronics Engineering • B Eng Hons • Masters in Strategy • Project Management
Ms H Khumalo	Necsa Group Chief Financial Officer	01 September 2017 – 31 December 2021	• Master of Business Leadership (MBL) • Post-Graduate Diploma, Business Management (PGDBM) • Bcom (Majors: Business Management and Internal Auditing • National Diploma: Internal Auditing
Ms P Hawadi	NTP Chief Financial Officer Acting Group Chief Financial Officer Group Chief Financial Officer	01 October 2015 01 June 2021 - 31 December 2021 03 January 2022	• CA (SA) • Programme for executive development • Transition to Business Leadership • Foundation to Business Leadership • BCom Honours Accounting • BCom Accounting
Mr Petrus J Schutte	Pelchem Chief Financial Officer	2019-to date	• CGMA; Chartered Institute of Management Accountants • BCom [Honors] (Financial Management) • BCom (Accountancy)
Mr AB Myoli	Divisional Executive of Engineering and Technical Services Group Executive: Nuclear Manufacturing and advancement	1 February 2021 – 31 December 2021 03 January 2022	• BSc (Eng)(Mech) • Masters of Business Leadership (MBL) • Snr Management Programme • Diploma Packaging Management
Mr JF du Bruyn	Acting Chief Technology Officer	1 February 2021 – 28 February 2022	• NHDT Mech. Eng • HNDT QA Mang.
Mr R Ramatsui	Group Executive: Pelindaba Engineering, Construction and Consulting	01 September 2017-31 December 2021	• Project Management • Master of Business Administration
Mr U Natha	General Manager: Strategy and Performance Acting MD: Pelchem MD: Pelchem	01 September 2017 – October 2021 01 November 2021-28 February 2022 March 2022 – to date	• BSC (Chemical Engineering) • Master of Business Administration

Name	Capacity	Appointed date	Qualifications
Mr M Jantjie	Acting Chief Legal Advisor and Company Secretary (ex-officio member)	01 August 2019 – 01 June 2021	• BA (Majors: Psychology, Political Science) • Post Graduate Diploma in Higher Education (HDE) • LLB • LLM • Certificate in Industrial Relations UNISA
Ms F Nyembe	Company Secretary	01 June 2021 – to date	• LLB • LLM • Admitted attorney of the High Court of South Africa
Ms M Rasweswe	GE: Nuclear Compliance and Services	01 January 2017 – 31 Dec 2021	• N Dip Chemical Engineering
Mr Z Ismail	Acting Head of Internal Audit (Co-opted member)	01 November 2018 –to date	• BCompt Degree - UNISA
Prof Dr JR Zeevaart	Acting Divisional Executive: Research & Development	01 August 2019 – 22 Feb 2022	• BSc (Chemistry and Industrial Chemistry) • BSc (Hons) Chemistry • MSc (Bioinorganic Chemistry) • PhD (Radiochemistry)
Mr M Mondi	Group Executive: Human Resources and Real Estates Asset Management Group Executive: Human Resources and Real Estates Asset Management	01 September 2017 – 31 Dec 2021 01 January- to date	• Bachelor of Philosophy • BA Education • Masters Diploma (HRM) • Masters Artium (Labour Relations & HRM) • Management Development Programme
Mr F Mkhabela	Chief Risk Officer (ex-officio member)	03 January 2018 – to date	• B. Com (Accounting) • Honours B. Com (Auditing) • Certified Internal Auditor (CIA) • -Postgraduate Diploma in Management • Certification in Control Self-Assessment • Certificate in Public Sector Risk Management • Certificate in Performing an Effective Quality Assessment from the Institute of Internal Auditors South Africa (IIASA)
Dr N Tengimfene	General Manager: Corporate Communication & Stakeholder Relations	01 September 2017 - to date	• MA (Industrial & Organisational Psychology), Unisa • PhD (Psychology)
Ms Q Boyede	Group Executive : Strategy & Business Enablement	03 January 2022 – to date	• BSC (Chemical Engineering • Postgraduate diploma in Business Administration • Masters in Business Administration
Dr P Rampersadh	Group Executive : Research & Innovation	01 March 2022 – to date	• BSc Chemistry and Applied Chemistry • BSc (Hons) • MSc (Organometallic Chemistry) • PHD (Inorganic Chemistry) • Management Advancement Programme (MAP)
Ms N Rikhotso	Executive: Office Of the GCEO	03 January 2022 –to date	• Bachelor of Arts in Education • Bachelor of Education (Post graduate) • Higher Diploma in Integrated Marketing Communications (IMC) • Management Advancement Programme (MAP)

RISK MANAGEMENT

Introduction

Section 38(1)(a)(i) and 51(1)(a)(i) of the Public Finance Management Act (PFMA, 1999 as amended), require Accounting Officers to ensure that their institutions have and maintain effective, efficient and transparent systems of risk management. The primary objective of the Risk Management function is to support management of the Necsa Group in order to ensure that it improves and sustains its performance by protecting the organisation from adverse outcomes and optimising on opportunities.

To give effect to this objective, a risk assessment was undertaken with all entities in the Group in order to identify risks that could impede the attainment of objectives and to determine the levels of controls and action plans that are currently in place to mitigate the risks. Herewith is the report with the output of the top Group Risk Register review for Quarter 4 of the financial year ending 31 March 2022.

The report layout:

- Legends.
- Section A: Executive summary (Risk movement from quarter to quarter).
- Section B: Detailed risk progress report.

Legends

Risk level & colour code	Total risk factor	Risk evaluation	Explanation
Very high	21-25	**Unacceptable**	Very high level of control intervention is required to achieve an acceptable level of residual risk.
High	16-20	**Extreme caution**	Except under unique circumstances or conditions - High level of control intervention required to achieve an acceptable level of residual risk.
Medium	11-15	**Cautionary**	Moderate level of control intervention is required.
Low	6-10	**Acceptable**	Implies that the controls are adequate or effective.
Very low	1-5	**Very acceptable**	Implies that the controls are very adequate or effective.

Impact vs likelihood

Level of impact	Score	Explanation
Very high	5	Major impact on the organisation's goals and objectives, e.g. >25% deviation from set targets.
High	4	Significant impact on the organisation's goals and objectives, e.g. 10-25% deviation from set targets.
Medium	3	Measurable impact on the organisation's goals and objectives, e.g. 5-10% deviation from set targets.
Low	2	Minor impact on the organisation's goals and objectives, e.g. < 5% deviation from set targets.
Very low	1	Insignificant impact on the organisation's goals and objectives. It is not possible to measure the impact as it is minimal.

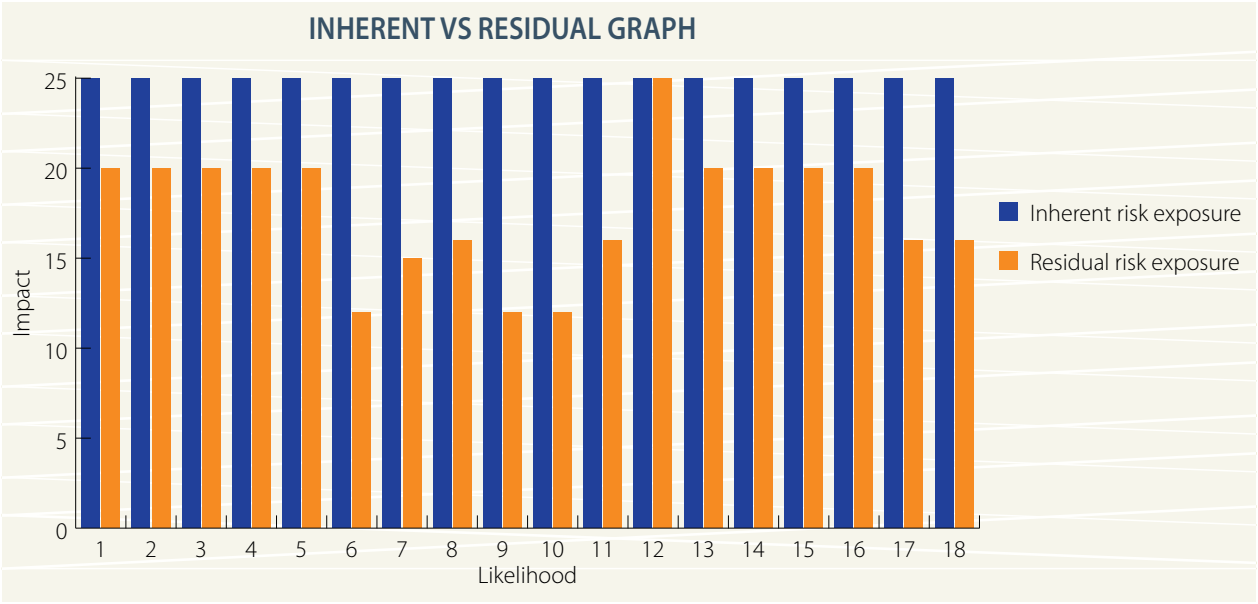
Level of likelihood	Score	Explanation
Very high	5	Highly likely to occur as the circumstances which will cause this risk to eventuate are also very likely to be created.
High	4	Very likely to occur, based on the circumstances.
Medium	3	Likely to occur as it is clear that the risk will probably eventuate.
Low	2	Unlikely to occur, based on current information, as the circumstances likely to trigger the risk are also unlikely to occur.
Very low	1	Highly unlikely to occur, however, still needs to be monitored as certain circumstances could result in this risk becoming more likely to occur.

Section A: Risk Movement from Q3 2021/22 – Q4 2021/22

RISK	INHERENT RISK	RESIDUAL RISK RATING Q3 2021/22	RESIDUAL RISK RATING Q4 2021/22		
			Impact	Likelihood	Risk level
NECSA CORPORATE:					
RESIDUAL RISKS LEVEL RATED BETWEEN 20 AND 25					
1. Going concern status resulting in the limitation to funding its operation and strategy	25	25	5	4	20
2. Liquidity risk – inability of Necsa to meet its obligations when they fall due (Ineffective cash management)	25	25	5	4	20
3. The Necsa not achieving an unqualified audit opinion	25	25	5	4	20
4. The Necsa's assets not being insured to the replacement value and business interruption	25	20	5	4	20
5. Pelindaba Enterprises not achieving its sales target - Commercial risk	25	20	5	4	20
RESIDUAL RISKS LEVEL RATED 16 AND BELOW					
6. Single supplier of fuel elements & target plates)	25	12	4	3	12
7. Construction of a new MPR as a source of neutrons	25	15	5	3	15
8. External hackers could compromise organisational data integrity and information security	25	16	4	4	16
9. Loss of information and data on the Necsa's systems (including laptops & external storage media) could result in lack of organisational effectiveness	25	12	3	4	12
10. Reputational damages	25	12	4	3	12
11. Loss of institutional knowledge	25	16	4	4	16
PELCHEM TOP RISK:					
RESIDUAL RISK LEVEL RATED BETWEEN 20 AND 25					
12. Going concern (Liquidity challenges)	25	25	5	5	25
13. Loss of revenue	25	20	5	4	20
14. Loss of production plant facilities insurance coverage,e.g. business interruption	25	20	5	4	20
15. Pelchem: Environmental non-compliance: Evaporation Pond (Pan 9)(Licence to Operate)	25	20	5	4	20
16. Pelchem: Delays in implementing short-term projects	25	20	5	4	20
NTP TOP RISK:					
RESIDUAL RISK LEVEL RATED 16 AND BELOW					
17. In-Cell waste capacity constraints – Inadequate capacity to handle high density U-residue	25	16	4	4	16
18. Business growth stagnation	25	16	4	4	16
NEW RISKS					
19. Destruction of the Necsa's properties/sites by arson (Refer to Annexure A)	25	New	5	3	15
20. Inability for HR/Payroll systems SAge300 to validate overtime rates and duplications of claims (control deficiencies)	25	New	4	4	16
External risks (New)					
21. Increasing anti-nuclear energy message (Source of Necsa business)	20	15	5	3	15
22. Necsa: DMRE grant reduction	25	25	5	5	25

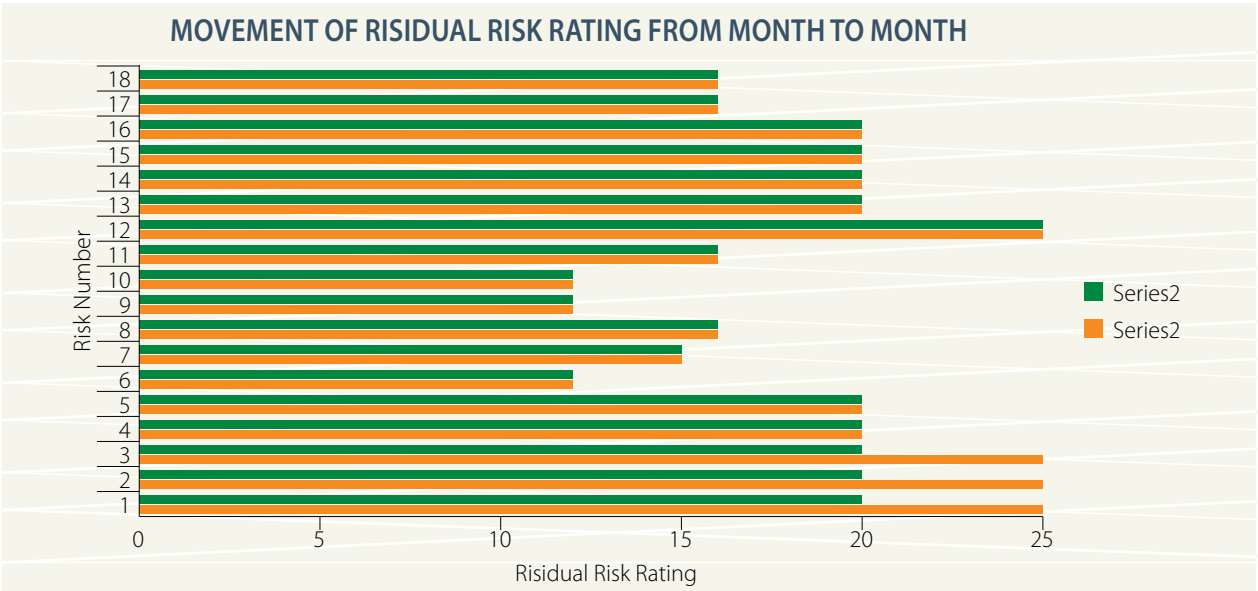
Risk management analysis: Internal risks

Chart 9: Inherent vs Residual graph



The chart depicted above compares inherent risk rating and the residual risk rating. Risks shown on the left hand side are higher inherent risks. The greater the gap between the inherent and residual risk the more effective the controls mitigating the risks are. Management should concentrate on controlling high residual risks, especially those with a low control effectiveness.

Chart 10: Movement of residual risk from quarter to quarter



The chart depicted above compares the residual risk rating of the current reporting quarter to the previous quarter. The bottom bar represent the residual risk rating of the risk in the previous quarter. The greater the gap between the bottom and top bars the more effective management in implementing the risk mitigating measures. Management should concentrate on controlling high residual risks ratings (16-25), especially those with no or less movement from quarter-to-quarter.

SUSTAINABILITY REPORT

INTRODUCTION

The Necsa Group is committed to the goals of sustainable development to ensure that opportunities available to future generations are not compromised. To this end, the company's economic, social and environmental impacts are considered.

In each of the three domains, sustainability is examined in terms of the relevant capitals at the core of the International Integrated Reporting Framework and relevant performance indicators presented.

10.1 ECONOMIC SUSTAINABILITY

The following integrated report capitals are directly linked to economic sustainability:

The Necsa's financial capital includes operational and capital grants from government, revenues from commercial ventures as well as debt financing. The Necsa manages its financial capital through its Financial Capital division, Research and Innovation, its two commercial subsidiaries, NTP and Pelchem, as well as the Advanced Manufacturing and Engineering Unit as an incubator of new business ventures.

Table 46 : Financial capital indicators

Necsa Group	2017	2018	2019	2020	2021	2022
Necsa corporate sales	R401m	R388m	R433m	R414m	R364m	R397m
NTP Group net profit	R203m	R122m	R147m	(R74m)	R35m	R64m
Pelchem Group net profit	(R36m)	(R35m)	(R47m)	(R63m)	(R74m)	(R63m)
Group bank overdraft	R124m	R32m	R46m	R24m	R14m	R14m

Necsa's manufactured capital includes its buildings, infrastructure, plant and equipment used in its operations. It is managed jointly by REAM, Engineering and Technical Services division, Security Services and Corporate Finance departments, as well as the respective facility operating units.

Table 47 : Manufactured capital indicators

Necsa Group	2017	2018	2019	2020	2021	2022
Research reactor availability	298 days	299 days	276.06 days	302.9 days	299 days	293.76 days

The Necsa's intellectual capital includes the organisation's stock of intellectual property, as well as the tacit knowledge embedded in systems and possesses. The Necsa manages its intellectual capital through the Intellectual Property (IP) office in the Business Development Department and the Knowledge Management Unit. The R&TD Division generates new IP.

Table 48 : Intellectual capital indicators

Necsa Group	2017	2018	2019	2020	2021	2022
Innovation disclosure	15	10	10	8	8	7
Research publications	43	45	44	35	33	36
Internationally granted patents	10	7	2	2	2	8

10.2 SOCIAL SUSTAINABILITY

The Necsa's human capital includes the vast educational qualifications of its staff and their nuclear industry experience as well as their motivation to innovate and collaborate. The HR Department, in collaboration with the Necsa Learning Academy, are dedicated to managing this capital.

Table 49 : Human capital indicators						
Necsa Group	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Staff number	1 912	1 962	1 900	1 821	1825	1775
Trade test conducted	304	437	384	334	210	176
Disabling injury incident rate	1.1	1.03	0.68	0.56	0	0.67
Non-unionised staff percentage	15.3	14.61	11.98	7.18	7.35	6.88

10.3 ENVIRONMENTAL SUSTAINABILITY

The Necsa's Environmental Management Group takes responsibility for environmental monitoring on the Pelindaba site and has a veterinarian on call to attend to wildlife in need. The Nuclear Liability Management Department performs ongoing decommissioning and decontamination while the Utilities and Facilities Department manages water and electricity consumption.

Table 50: Natural capital indicators					
Necsa Group	**2017**	**2018**	**2019**	**2020**	**2021**
Public dose impact as % of allowable limit (0.250 mSv)	2.2	1.94	1.16	1.47	1.71
Percentage of permitted effluent released to Crocodile River (250 000m)	29	20.5	27	41	37.7
Annual electricity usage	76 GW.h	67 GW.h	69.61GW.h	57.61GWh	58.5GWh
Annual water usage	815 500 m^3	776 920m^3	771 400 m^3	827 000 m^3	922 700m^3

KNOWLEDGE DISSEMINATION

Addendum: List of research publications & reports

Peer Reviewed Publications:

1. Kgatle, M. M., Boshomane, T. M. G., Lawal, I. O., Mokoala, K. M. G., Mokgoro, N. P., Lourens, N., Kairemo, K., Zeevaart, J. R., Vorster, M. & Sathekge, M. M. (2021). Immune Checkpoints, Inhibitors and Radionuclides in Prostate Cancer: Promising Combinatorial Therapy Approach. International Journal of Molecular Sciences Article ID 4109. https://doi.org/10.3390/ijms22084109 RC-MNG-PUB-21002 Dr Kgatla is a young female researcher

2. Kleynhans, J., Cloete, T., Dunn, H. C., Posavec, L., Grobler, A. F., Zimmermann, M. B. & Zeevaart, J. R. (2021). Elucidating the effect of specific surface area on the gastrointestinal absorption of nanostructured calcium through Calcium-45 in vivo radiotracing. Applied Radiation and Isotopes Article ID 109702. https://doi.org/10.1016/j.apradiso.2021.109702 RC-MNG-PUB-21003. Dr Kleynhans is a young female researcher

3. Mandiwana, V., Kalombo, L., Hayeshi, R., Zeevaart, J. R. & Ebenhan, T. (2021). Preclinical Assessment Addressing Intravenous Administration of a [68Ga] Ga-PSMA-617 Microemulsion: Acute In Vivo Toxicity, Tolerability, PET Imaging, and Biodistribution. Molecules Article ID 26, 2650. https://doi.org/10.3390/molecules26092650 PIF-TRADDEL-PUB-21001 Dr Mandiwana is a young female researcher

4. E.T. Moraba, T. Zuva, C. Du, D. Marais. Parametric Study for the Design of a Neutron Radiography Camera-Based Detector System. Advances in Science, Technology and Engineering Systems Journal, vol. 6, no. 3, pp. 248-256 (2021). HTTP://DX.DOI.ORG/10.25046/AJ060327

   Mr Moraba is a Necsa permanent employee and young researcher recently completing his MTech

5. Bernhardt, P., Svensson, J., Hemmingsson, J., Van der Meulen, N. P., Zeevaart, J. R., Konijnenberg, M. W., Müller, C. & Kindblom, J. (2021). Dosimetric Analysis of the Short-Ranged Particle Emitter 161Tb for Radionuclide Therapy of Metastatic Prostate Cancer. Cancers Article ID 2011. https://doi.org/10.3390/cancers13092011 RL-RPCTb161-PUB-21002

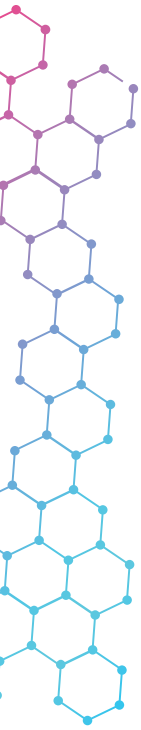
6. Borgna, F., Baritt, P., Grundler, P. V., Talip, Z., Cohrs, S., Zeevaart, J. R., Köster, U., Schibli, R., Van der Meulen, N. P. & Müller, C. (2021). Simultaneous Visualization of 161Tb- and 177Lu-Labeled Somatostatin Analogues Using Dual-Isotope SPECT Imaging. Pharmaceutics Article ID 536. https://doi.org/10.3390/pharmaceutics13040536 RL-RPCTb161-PUB-21001

7. Dire, R. M., Bissett, H., Delport, D. & Premlall, K. (2021). Evaluation of spheroidized tungsten carbide powder produced by induction plasma melting. Journal of The Southern African Institute of Mining and Metallurgy Article ID 6836. http://dx.doi.org/10.17159/2411-9717/1352/2021 AC-AMI-PUB-20001 [Publication/Presentation date 06 July 2021]

8. Silethelwe, C., Tshabalala, L. C., Bissett, H., Lesufi, M., Mnguni, N. K., Manama, T. & Hoosain, S. (2021). Spheroidisation of Stainless Steel Powder for Additive Manufacturing. Metals Article ID 1081. https://doi.org/10.3390/met11071081 AC-AMI2020SPH-PUB-21001 [Publication/Presentation date 07 July 2021]

9. Seya, W. A., Kolesnikov, A., Van der Walt, I. J., Bissett, H., (2021). MODELING OF TITANIUM ALLOYS SPHEROIDIZATION IN PLASMA REACTOR. 15th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT) and Editorial Board of Applied Thermal Engineering (ATE-HEFAT 2021); July 2021: 1439-1443. https://hefat2021.org/committee/ AC-AMI2020SPH-PUB-21002[Publication/Presentation date 26 July 2021]

10. Mbwebwe, K. J., Kolesnikov, A., Van der Walt, I. J., Bissett, H., (2021). Modelling of Multiphase DC Plasma Jet.



Proceedings of the 15th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT2021): 1433-1438. https://hefat2021.org/committee AC-AMI2020SPH-PUB-21009 [Publication/Presentation date 26 July 2021]

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*The following further two peer reviewed journal publications emanated from the usage of Necsa beam line facilities. Although no Necsa co-author was present in the publications, Necsa was acknowledged for contributing access to the research facility.

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14. AM Venter (Significant contribution to the drafting and review of publication): Neutron Scattering with Low and Medium Flux Neutron Sources, Processes, Detection and Applications, IAEA-TECDOC-1961 978-92-0-116721-7 Identifiers: IAEAL 21-01419, ISBN 978-92-0-116721-7 (paperback), ISBN 978-92-0-116621-0 (pdf).Neutron Scattering with Low and Medium Flux Neutron Sources | IAEA. Report No.: RS-DIFF-PUB-21005

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33. D. Marais, Calculations of the OPAL beam line flux characteristics: Report No.:

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35. T. Ntsoane, GIXRD and WAXS phase investigation of heat-treated Cr thin films deposited on 6H SiC substrate: Report No.: RS-DIFF-REP-22006

36. T. Ntsoane, GIXRD and WAXS phase investigation of Pd thin films deposited on irradiated 6H SiC substrate: Report No.: RS-DIFF-REP-22007

37. L.C Bam, RS-COMMERC-REP-22001: Quantification of Porosity Information Within the Geological Samples: Mixrad Facility

38. RB Nshimirimana, RS-WOR-REP-21001, MPR BEAMLINE URS MODELLING SUPPORT PROJECT: Floor loading determination for neutron radiography facilities at the MPR

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Innovation disclosures:

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2. Monnahela, O. S., Le Roux, J. P., Malinga, E. B., (2021). (Confidential title). - [Intellectual Property] AC-FEIF227-IVD-21001 [Publication/Presentation date 21 September 2021]

3. Van der Walt, I. J. (2021). (Confidential title). - [Intellectual Property] AC-PGR-IVD-21001 [Publication/Presentation date 17 September 2021]

4. Daniels, G.C., Mahafa T. (Confidential title). - [Intellectual Property] RD-ADM-IVD-21001 [Publication/Presentation date 23 September 2021]

5. Driver, C. H. S. (2021). (Confidential title). - [Intellectual Property] RL-RPCTCRE-IVD-21001Dr Driver is a Necsa permanent employee and a young researcher.

6. Lekgoathi, M. D. S. (2022). (Confidential title). - [Intellectual Property] AC-LIPF6TECH-IVD-22001

7. T. Mahafa, Confidential title: RD-ADM-IVD-21002

ANNUAL FINANCIAL STATEMENTS

The South African Nuclear Energy Corporation SOC Limited and its Group Companies

(Registration number 2000/003735/06)

Trading as Necsa

Annual Financial Statements

for the year ended 31 March 2022

General Information

Country of incorporation and domicile	South Africa
Nature of business and principal activities	The South African Nuclear Energy Corporation SOC Limited is responsible for managing certain institutional obligations defined in the Nuclear Energy Act, No. 46 of 1999
Directors	Mr DR Nicholls (Chairperson) Dr NT Magau Ms L Noge-Tungamirai Prof GJ Davids Ms SKN Masango Ms PE Monale Adv A Chowan Mr LJ Shayi Ms BM Makgopa Mr MJ Maboa Amb NN Ntshinga Mr M van Schalkwyk Mr L Tyabashe (GCEO)
Registered office	Elias Motsoaledi Street Extension (Church Street West) R104 Pelindaba Brits Magisterial District, Madibeng Municipality North West Province 0240
Business address	Elias Motsoaledi Street Extension (Church Street West) R104 Pelindaba Brits Magisterial District, Madibeng Municipality North West Province 0240
Postal address	PO Box 582 Pretoria 0001
Holding company	Department of Mineral Resources and Energy
Auditor	Auditor-General of South Africa
Secretary	Ms Fakazile Nyembe
Company registration number	2000/003735/06
Level of assurance	These annual financial statements have been audited in compliance with the applicable requirements of the Companies Act, 2008(Act No 71 of 2008).
Preparer	The annual financial statements were compiled under the supervision: Ms Precious Hawadi CA (SA)

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Published

07 August 2022

Report of the Audit and Risk Committee

We herewith present our report for the financial year ended 31 March 2022.

1. AUDIT AND RISK COMMITTEE REPORT

The Necsa Audit and Risk Committee (ARC) is a formal statutory committee in terms of Section 51(1)(a)(ii), Section 77 of the Public Finance and Management Act read together with Treasury Regulations 27.1, the Companies Act and functions as a governance structure of the entity. The committee functions within documented terms of reference and complies with relevant legislation, regulation and governance codes. This report of ARC is presented to the stakeholders in compliance with the requirements of the Companies Act 71, of 2008 and the King Code of Governance Principles.

2. COMPOSITION OF THE AUDIT COMMITTEE

The committee is comprised of five independent non-executive directors. The committee is elected by the Necsa Board subsequent to the Board appointment by the Minister. The committee remains fully capacitated since the appointment of the new Board in January 2020.

3. AUDIT AND RISK COMMITTEE TERMS OF REFERENCE

The ARC has adopted a formal Terms of Reference that have been approved by the Board of Directors. The Committee has conducted its affairs in compliance with its Terms of Reference and has discharged its responsibilities contained therein. The terms of reference are available on request.

4. AUDIT AND RISK COMMITTEE MEMBERS, MEETING ATTENDANCE AND QUALIFICATIONS

Mr LJ Shayi	24 February 2020	Master of Business Leadership, Master of Science in Chemistry BSc (Hons), Majors in Physical and Inorganic Chemistry, Bsc: Majors in Chemistry and Physics
Adv A Chowan	24 February 2020	CA(SA) Registered Auditor, Bachelor of Accountancy, Post Graduate Diploma in Accounting, LLB degree
Ms S Masango	24 February 2020	Masters in Nuclear Physics, Hons in Nuclear Physics, BSc Physics & Electronics (major in electronics), Project Management Diploma, Certificate in Detector and Instrumentation Technology
Ms L Noge Tungamirai	24 February 2020	Master of Business Administration, Master Network Engineering Diploma, IT Programming Diploma
Dr GJ Davids	15 January 2021	D Phil, Master Degrees in Public Administration, B.A. (Hon) Development Administration, B.A Public Administration

The Committee meets at least four times per year as per its terms of reference. Attendance of meetings, dates of appointments as well as qualifications of the members are included in the governance report.

Report of the Audit and Risk Committee (continued)

5. ROLES AND RESPONSIBILITIES

5.1 Statutory Duties

The Committee's role and responsibilities include statutory duties as per the Companies Act, PFMA, Treasury Regulations and further responsibilities as assigned to it by the Board of Directors.

5.2 External Auditor Appointments and Independence

The Committee has satisfied itself that the external auditor was independent of the Group, as set out in the Companies Act, which includes consideration of conflicts of interest as prescribed by the Public Audit Act (PAA). Requisite assurance was sought and provided by the external auditor that internal governance processes within the audit firm, support and demonstrate its claims to independence. The committee, in consultation with executive management, agreed to the engagement letter, audit plan and budgeted fee for the 2022 year.

5.3 Financial Statements and Accounting Practices

The Committee has evaluated the Annual Financial Statements of the company and the Group for the year ended 31 March 2022 and based on the information provided to the Committee, considers that they comply in all material respects with the requirements for the preparation of the Annual Financial Statements, with the requirements of the Companies Act and the PFMA, and International Financial Reporting Standards. The Committee concurs that the adoption of the going concern premise in the preparation of the Annual Financial Statements is appropriate. The Committee has recommended the adoption of the Annual Financial Statements and the Integrated Annual Report by the Board of Directors. The ARC has:

- Reviewed and approved the appropriateness of accounting policies, disclosure policies and the effectiveness of internal financial controls;
- Reviewed and discussed with the Auditor-General and Accounting Authority the audited Annual Financial Statements;
- Reviewed the Auditor-General's management letter and management responses;
- Reviewed changes in accounting policies and practices;
- Reviewed significant adjustments resulting from the audit; and
- Reviewed and discussed with the Accounting Authority, Performance Information submitted to the Auditor-General.

5.4 Internal Financial Controls

While the Board is responsible for the internal control systems and for reviewing their effectiveness, responsibility for their actual implementation and maintenance rests with executive management. The systems of internal control are based on established organizational structures, together with written policies and procedures, and provide for suitably qualified employees, segregation of duties, clearly defined lines of authority and accountability.

Report of the Audit and Risk Committee (continued)

As a result of the issues outlined under the Finance Section in this report as well as the external audit opinions for the three previous years, there is room for improvement in the internal financial function and various recommendations have been made to management towards improving the control environment. The Committee has overseen a process by which Internal Audit has performed audits according to a risk based audit plan where the effectiveness of the risk management and internal controls were evaluated.

5.5 Combined Assurance

Ensure the combined assurance model addresses all significant risks facing the group; and by monitoring of the relationship between external and internal assurance providers and the group.

5.6 Going Concern

Notwithstanding the liquidity issues at Necsa and its subsidiary Pelchem SOC Ltd, the Committee has reviewed management's assessment of the going concern status of the Group and has recommended to the Board of Directors that the Group is a going concern.

Despite the previous losses that Necsa have made historically there is a positive trajectory with reduced losses year on year end, the company has a track record of continuing in operation, wherein this resilience will continue into the foreseeable future. Section 12 of the Nuclear Energy Act supports the mandate of the company in support of going concern. Furthermore, Necsa has the ability to pay its short term obligations, which it will do through the initiatives documented including through working capital management, austerity measures implemented, incresing revenue streams and prioritisation of cash generating projects to name a few. Refer to note 48 for additional details.

5.7 Internal Audit

The Committee is responsible for ensuring that the Group's Internal Audit is independent and has the necessary resources, standing and authority within the Group to enable it to discharge its duties. Furthermore, the Committee oversees cooperation between the internal and external auditors and serves as a link between the Board of Directors and these functions. The Committee considered and approved the Internal Audit Charter. The Internal Audit function's annual audit plan and three year strategic plan were approved by the Committee.

The Internal Audit function reports administratively to the Chief Executive Officer and functionally to this Committee and is responsible for reviewing and providing assurance on the adequacy of the internal control environment across all of the Group's operations.

The Chief Audit Executive has direct access to the Committee, primarily through its Chairperson. From the various reports of the internal auditors, the findings were noted and recommendation made to management to implement the corrective actions.

Report of the Audit and Risk Committee (continued)

5.8 Auditor's Report

To confirm the independence of the external auditors, the Committee is satisfied that the audit was conducted without influence from Management. To this end, the Committee remains open to discussing any other issues that the auditors may have, without the presence of Management.

The Committee accepts the audit opinion of the Auditor-General on the Annual Financial Statements and recommends that the audited Annual Financial Statements be accepted and read together with the report of the Auditor-General.

The Committee expresses its appreciation to the accounting authority, the senior management team, internal audit and the Auditor- General for their continued support and dedication during the year under review.

On behalf of the Audit and Risk Committee:

Adv A Chowan

Chairman - Audit and Risk Committee

07 August 2022

Directors' Responsibilities and Approval

The directors are required in terms of the Companies Act, 2008(Act No 71 of 2008) and the Public Finance Management Act No.1 of 1999 (PFMA) to maintain adequate accounting records and are responsible for the content and integrity of the annual financial statements and related financial information included in this report. It is their responsibility to ensure that the annual financial statements fairly present the state of affairs of the group as at the end of the financial year and the results of its operations and cash flows for the period then ended, in conformity with International Financial Reporting Standards. The external auditor is engaged to express an independent opinion on the annual financial statements.

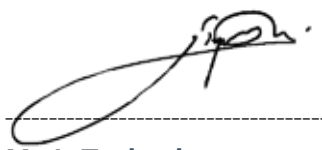
The annual financial statements are prepared in accordance with International Financial Reporting Standards and the requirements of the Companies Act of South Africa; and are based upon appropriate accounting policies consistently applied and supported by reasonable and prudent judgements and estimates.

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

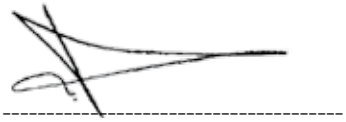
The directors are of the opinion, based on the information and explanations given by management, that the system of internal control provides reasonable assurance that the financial records may be relied on for the preparation of the annual financial statements. However, any system of internal financial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

The directors have reviewed the group's cash flow forecast for the year to 31 March 2023 and, in light of this review and the current financial position, they are satisfied that the group has or had access to adequate resources to continue in operational existence for the foreseeable future.

The annual financial statements set out on pages 165 to 291, which have been prepared on the going concern basis, were approved by the directors on 30 May 2022 and were signed on their behalf by:



Mr. L. Tyabashe
Group Chief Executive Officer
07 August 2022



Mr. DR Nicholls
Chairperson of Necsa Group Board of Directors

Group Secretary's Certification

In terms of Section 88(2)(e) of the Companies Act, 2008(Act No 71 of 2008), as amended, I certify that the group has lodged with the Companies and Intellectual Properties Commission all such returns as are required of a public company in terms of the Act and that all such returns are true, correct and up to date.

In my opinion as Company Secretary, I hereby confirm, in terms of the Companies Act, 2008(Act No 71 of 2008), for the year ended 31 March 2022, that the group has lodged with the Commissioner of Companies all such returns as are required of a public company in terms of this Act and that all such returns are true, correct and up to date.

Ms RF Nyembe

Company Secretary

7 August 2022

Directors' Report

The directors have pleasure in submitting their report on the annual financial statements of The South African Nuclear Energy Corporation SOC Limited and its Group Companies for the year ended 31 March 2022.

1. NATURE OF BUSINESS

Incorporated in the year 2000. The South African Nuclear Energy Corporation SOC Limited (Necsa) is mandated to undertake and promote research and development (R&D) in the field of nuclear energy and radiation sciences and technology. The company is also responsible for processing source material, special nuclear material and restricted material and to reprocess and enrich these. Apart from its main activities at Pelindaba, which include operation and utilisation of the SAFARI-1 research reactor, Necsa also manages and operates the Vaalputs National Radioactive Waste Disposal Facility in the Northern Cape on behalf of the National Radioactive Waste Disposal Institute (NRWDI).

Necsa engages in commercial business mainly through its wholly-owned commercial subsidiaries NTP Radioisotopes SOC Ltd (NTP),which is responsible for a range of radiation-based products and services for healthcare, life sciences and industry, and Pelchem SOC Ltd (Pelchem), which supplies fluorine and fluorine-based products. Both subsidiaries, together with their subsidiaries, supply local and foreign markets, earning valuable foreign exchange for South Africa.

There have been no material changes to the nature of the group's business from the prior year.

2. REVIEW OF FINANCIAL RESULTS AND ACTIVITIES

Necsa derives its mandate from the Nuclear Energy Act, No. 46 of 1999 and the Minister of Energy (the Minister) to manage and operate certain of the Republic's nuclear related functions and facilities.

Necsa has been assigned the responsibility for managing certain institutional obligations of the Republic as defined in the Act. The main functions of the Company are:

- To undertake and promote research and development in the field of nuclear energy and radiation sciences and technology and subject to the Safeguards Agreement, to make these generally available;
- To process source material, special nuclear material and restricted material and to process and enrich source material and nuclear material; and
- To co-operate with any person or institution in matters falling within these functions subject to the approval of the Minister.

Ancillary powers and functions may be granted to the Group

- In connection with its main functions;
- In order to create and utilise viable business opportunities in commerce and industry; and
- In order to undertake the development and/or exploitation of nuclear technology or nuclear related technology. With regard to its nuclear related activities Necsa is governed by Nuclear Installations Licences (NILs) issued by the National Nuclear Regulator (NNR) in terms of the Nuclear Regulator Act 47 of 1999.

The subsidiary companies in turn, have a mandate from Necsa to operate in a self-sustainable manner and to remain competitive in the industries within which they operate.

Directors' Report (continued)

Full details of the financial position, results of operations and cash flows of the group are set out in these consolidated annual financial statements.

3. SHARE CAPITAL

There have been no changes to the authorised or issued share capital during the year under review.

4. DIVIDENDS

Refer to the Statement of Changes in Equity for dividends declared and paid to shareholders during the year.

5. DIRECTORATE

Details of the Directors in office during the year and to the date of this report are as follows:

Directors	Designation	Appointed
Mr L Tyabashe	Group Chief Executive Officer	Appointed 01 January 2021
Mr DR Nicholls	Chairperson of the Board	Appointed 17 January 2020
Dr NT Magau	Non-executive	Appointed 17 January 2020
Ms L Noge-Tungamirai	Non-executive	Appointed 17 January 2020
Dr GJ Davids	Non-executive	Appointed 17 January 2020
Ms SKN Masango	Non-executive	Appointed 17 January 2020
Ms PE Monale	Non-executive	Appointed 01 February 2020
Adv A Chowan	Non-executive	Appointed 17 January 2020
Mr LJ Shayi	Non-executive	Appointed 17 January 2020
Ms BM Makgopa	Non-executive	Appointed 01 February 2020
Mr MJ Maboa	Non-executive	Appointed 17 January 2020
Amb NN Ntshinga	Non-executive	Appointed 26 November 2021
Mr M van Schalkwyk	Non-executive	Apponted 26 Novmeber 2021

6. DIRECTORS' INTERESTS IN CONTRACTS

During the financial year, no contracts were entered into which directors or officers of the group had an interest and which significantly affected the business of the group.

7. INTERESTS IN SUBSIDIARIES, ASSOCIATES AND JOINT ARRANGEMENTS

Details of material interests in subsidiary companies, associates and joint arrangements are presented in the consolidated annual financial statements in notes 6 and 7.

The interest of the group in the profits and losses of its subsidiaries, associates and joint arrangements for the year ended 31 March 2022 are as follows:

Name of Company	Nature of Business	Place of Incorporation	Issued Share Capital		Effective percentage		Number of Shares		Profit/(Loss) after taxation	
			2022	2021	2022	2021	2022	2021	2022	2021
			R	R	%	%			R'000	R'000
ARECSA Human Capital SOC Ltd (5 and 6)	Training in nuclear & related industries	South Africa	1,000	1,000	51	51	510	510		60
Cyclofil SOC Ltd (5)	Dormant	South Africa	1	1	100	100	1	1		-
NTP Radioisotopes SOC Ltd (5)	Marketing and distribution of radiopharmaceuticals	South Africa	220	220	100	100	220	220	52,032	23,594
NTP Logistics SOC Ltd (1)	Logistics	South Africa	100	100	51	51	51	51	10,011	6,960
NTP Radioisotopes Europe SA (1)	Control lost in 2018	Belgium	726,137	726,137	100	100	4,734	4,734	-	-
AEC Amersham SOC Ltd (1)	Marketing of radiopharmaceutical products	South Africa	4,000	4,000	100	100	4,000	4,000	19,749	8,080
Pharmatopes SOC Ltd (3)	Dormant	South Africa	1,000	1,000	100	100	1,000	1,000	(3)	(2)
Gammatec NDT Supplies SOC Ltd (1)	Non-destructive testing equipment and accessories	South Africa	300	300	55	55	165	165	6,041	2,533
Gammatec Aseana NDT Supplies SDN. BHD (4)	Non-destructive testing equipment, accessories and consumables	Malaysia	860,074	860,074	55	55	275,000	275,000	-	-
Pelchem SOC Ltd (5)	Fluorochemical products	South Africa	770,310	770,310	100	100	770,310	770,310	(63,533)	74,425
Fluoro Pack SOC Ltd (2)	Dormant	South Africa	100	100	100	100	100	100	-	-
Fluorochem SOC Ltd (2)	Dormant	South Africa	100	100	100	100	100	100	-	-
Fluoropharm SOC Ltd (2)	Dormant	South Africa	4,000	4,000	100	100	4,000	4,000	-	-
Limited Electronics South Africa SOC Ltd (2)	Manufacturing and distribution of Nitrogen Tri-Fluoride	South Africa	1,000	1,000	100	100	1,000	1,000	-	-

Directors' Report (continued)

1 Subsidiary of NTP Radioisotopes SOC Ltd

2 Subsidiary of Pelchem SOC Ltd

3 Subsidiary of AEC Amersham SOC Ltd

4 Subsidiary of Gammatec NDT Supplies SOC Ltd

5 Subsidiary of Necsa SOC Ltd

6 The profit/(loss) after tax relates to interest earned on ARECSA's bank account. ARECSA is almost wholly impaired.

Details of the company investment in subsidiaries are set out in note 6.

There were no significant acquisitions or divestitures during the year ended 31 March 2022.

8. INTEREST IN ASSOCIATES

The group's holding company is Department of Mineral Resources and Energy which holds 100% (2021: 100%) of the group's equity. Department of Mineral Resources and Energy is incorporated in South Africa.

Name of Company	Nature of Business	Place of Incorporation	Issued Share Capital		Effective Percentage		Number of Shares	
			2022	2021	2022	2021	2022	2021
			R	R	%	%		
Business Venture Exploration Investments No. 33 (Pty) Ltd (2)	Dormant	South Africa	3,840	3,840	41,61	41,61	1,598	1,598
Gamwave (Pty) Ltd (formerly Cyclotope)(3)	Radiation of food sources	South Africa	100	100	40	40	40	40
Oserix(1)	Supply of isotopes and accessories for the radiographic non-destructive testing market	South Africa	582	582	13,75	13,75	80	80
Element 42 (3)	Dormant	South Africa	-	-	50	50	-	-

1 Associate of Gammatec NDT Supplies SOC Ltd. Gammatec NDT Supplies SOC Ltd holds 25% of Oserix issued share capital.

NTP Radioisotopes SOC Ltd holds 55% of Gammatec NDT Supplies SOC Ltd therefore resulting in the group having significant influence over the associate.

2 Associate of Necsa SOC Limited

3 Associate of NTP Radioisotopes SOC Ltd

9. SHAREHOLDER

The Company's sole shareholder is the State, represented by the Minister of Mineral Resources and Energy.

Directors' Report (continued)

10. EVENTS AFTER THE REPORTING PERIOD

The directors are not aware of any material event which occurred after the reporting date and up to the date of this report.

11. GOING CONCERN

The annual financial statements have been prepared on the basis of accounting policies applicable to a going concern. This basis presumes that funds will be available to finance future operations and that the realisation of assets and settlement of liabilities, contingent obligations and commitments will occur in the ordinary course of business.

We draw attention to the fact that at 31 March 2022, the group had accumulated losses of R 333,832 and that the group's total assets exceed its liabilities by R 504,187.

Despite the previous losses that Necsa have made historically there is a positive trajectory with reduced losses year at year end. The company has a track record of continuing in operation, wherein this resilience will continue into the foreseeable future. Section 12 of the Nuclear Energy Act supports the mandate of the company in support of going concern. Furthermore, Necsa has the ability to pay its short-term obligations, which it will do through the initiatives documented including through working capital management, austerity measure implementation, increasing revenue streams and prioritization of cash generating projects to name a few.

Refer to note 50 for additional details around the going concern consideration of the company.

12. AUDITORS

Auditor-General of South Africa continued in office as auditors for the company and its subsidiaries for 2022.

13. COMPANY SECRETARY

The company secretary is Ms RF Nyembe.

Postal address:	PO Box 582
	Pretoria
	0001
Business address:	Elias Motsoaledi Street Extension (Church Street West)
	R104 Pelindaba
	Brits Magisterial District, Madibeng Municipality
	North West Province
	0240

14. COMPLIANCE WITH LEGISLATION

The Directors believe the Group has complied, in all material respects, with the provisions of the Companies Act No. 71 of 2008, Public Finance Management Act No.1 of 1999 and the Nuclear Energy Act No. 46 of 1999 and other applicable legislation during the year under review.

Report of the auditor-general to Parliament on the South African Nuclear Energy Corporation SOC Limited

Report on the audit of the consolidated and separate financial statements

Disclaimer of opinion

1. I was engaged to audit the consolidated and separate financial statements of the South African Nuclear Energy Corporation SOC Limited and its subsidiaries (the group) set out on pages 165 to 291, which comprise the consolidated and separate statement of financial position as at 31 March 2022, the consolidated and separate statement of profit or loss and other comprehensive income, the consolidated and separate statement of changes in equity, and the consolidated and separate statement of cash flows for the year then ended, as well as notes to the financial statements, including a summary of significant accounting policies.

2. I do not express an opinion on the consolidated and separate financial statements of the group. Because of the significance of the matters described in the basis for disclaimer of opinion section of this auditor's report, I was unable to obtain sufficient appropriate audit evidence to provide a basis for an audit opinion on these consolidated and separate financial statements.

Basis for disclaimer of opinion

Consolidated financial statements

3. During 2021, I was unable to obtain sufficient appropriate audit evidence that the consolidated financial statements and the notes thereto have been properly prepared as required by International Financial Reporting Standard (IFRS) 10, Consolidated financial statements. Included in the consolidation is an amount of R73 086 000 (2020: R35 271 000) that could not be substantiated with supporting workings that corroborate the appropriateness of elimination journal entries. The group did not have adequate systems of internal control in place for the preparation of the consolidated financial statements. I was unable to audit the consolidated financial statements by alternative means. Consequently, I was unable to determine whether any adjustments were necessary to the consolidated financial statements as a whole. My audit opinion on the consolidated financial statements for the period ended 31 March 2021 was modified accordingly. My opinion on the current year financial statements is also modified because of the possible effects of this matter on the comparability of the consolidated financial statements between the current year and prior year.

Going concern

4. The consolidated and separate financial statements contain material limitations of scope, as has been reported in the basis for disclaimer of opinion section of this auditor's report, which creates an uncertainty about the reliability of the information on which the group's forecasts are based. I was unable to confirm the extent of this material uncertainty by alternative means.

Decommissioning and decontamination (D&D) on stage 1 liability and asset

5. I was unable to obtain sufficient appropriate audit evidence in respect of the D&D stage 1 liability due to the lack of appropriate audit evidence to support the group's estimated timing and quantum of estimated cash flows used in determining the liability. The group did not have adequate systems of internal control in place for record keeping and for recording transactions in the consolidated and separate financial statements to substantiate the forecasted cash flows used as a basis for the calculation of the D&D stage 1 liability. I was unable to confirm the D&D on stage 1 liability by alternative means. Consequently, I was unable to determine whether any adjustments were necessary to the D&D stage 1 liability stated at R4 762 140 000 (2021: R4 597 130 000, 2020: 4 236 762 000) in note 25 to the consolidated and separate financial statements. Furthermore due to my inability to obtain sufficient appropriate audit evidence for the D&D on stage 1 liability, I was unable to determine by alternative means, whether any adjustments are required to the D&D on stage 1 asset stated at R4 762 140 000 (2021: R4 597 130 000) in note 25 to the consolidated and separate financial statements.

Property, plant and equipment

6. During 2021, I was unable to obtain sufficient appropriate audit evidence that the group performed an adequate impairment assessment which considered all indicators of impairment as required by International Accounting Standards (IAS) 36: Impairment of assets, in respect of all of the classes of property, plant and equipment. I was unable to confirm by alternative means that property, plant and equipment are fairly stated. Consequently, I was unable to determine whether any adjustment was necessary to property, plant and equipment stated at R1 414 843 000 and R1 103 043 000 in note 4 of the consolidated and separate financial statements, respectively. My audit opinion on the consolidated and separate financial statements for the period ended 31 March 2021 was modified accordingly. My opinion on the current year financial statements is also modified because of the possible effects of this matter on the comparability of the Property, plant and equipment between the current year and prior year.

Provisions

7. I was unable to obtain sufficient appropriate audit evidence in respect of the Provision – employee benefit accruals as the group implemented a payroll and leave management system in the prior year, but did not ensure that accrued leave balances were correctly migrated from the old system to the new system, which resulted in numerous errors of which the full extent could not be determined. As a result, I could not confirm the Provision – employee benefit accruals by alternative means. Consequently, I was unable to determine whether any further adjustments were necessary to the Provision – employee benefit accruals stated at R130 062 000 (2021: R133 380 000) and R75 865 000 (2021: R86 313 000) in note 19 of the consolidated and separate financial statements, respectively.

Trade and other receivables

8. I was unable to obtain sufficient appropriate audit evidence for an amount of R48 401 744 included in the R279 549 000 of trade and other receivables for the subsidiary AEC-Amersham SOC Limited. I was unable to confirm the trade and other receivables of the subsidiary by alternative means. Consequently, I was unable to determine whether any adjustment was necessary to the R48 401 744 included in trade and other receivables stated at R279 549 000 in the consolidated financial statements.

Other operating expenses

9. I was unable to obtain sufficient appropriate audit evidence for other operating expenses, because the group was unable to provide the information and supporting documentation for other operating expenses. I could not confirm the other operating expenses by alternative means. Consequently, I was unable to determine whether any adjustment was necessary to other operating expenses stated at R1 039 208 000 and R1 041 241 000 in the consolidated and separate financial statements, respectively.

Administration and fees

10. The group did not account for expenses in terms of the Conceptual Framework for Financial Reporting. Included in administration expenses is amount of R49 092 935 relating rental of buildings which is an internal charge not an expense as defined. Consequently, administration and fees are overstated by R49 092 935 (2021: R49 087 144.) and other operating expenses are understated by R49 092 935 (2021: R49 087 144.) in the consolidated and separate financial statements, respectively.

Cost of sales

11. During 2021, I was unable to obtain sufficient appropriate audit evidence for cost of sales of R48 000 000 included in the R582 404 000 for the subsidiary, AEC-Amersham SOC Limited, due to the status of the accounting records. I was unable to obtain audit evidence for certain recorded transactions and could not confirm the cost of sales by alternative means. I was unable to determine the extent of adjustment necessary to the R48 000 000 included in cost of sales stated at R582 404 000 in note 31 to the consolidated financial statements. My audit opinion on the consolidated financial statements for the period ended 31 March 2021 was modified accordingly. My opinion on the current year financial statements is also modified because of the possible effects of this matter on the comparability of the Cost of sales between the current year and prior year.

Investment income

12. I was unable to obtain sufficient appropriate audit evidence for investment income: stage 1 D&D stated at R328 020 000 (2021: R314 947 000) in note 34 to the consolidated and separate financial statements, because this interest income is calculated based on the D&D stage 1 asset, for which I was not able to obtain sufficient appropriate audit evidence. Consequently, I was unable to determine whether any adjustments were necessary to the interest income: stage 1 D&D stated at R328 020 000 (2021: R314 947 000) in note 34 to the consolidated and separate financial statements.

Finance cost

13. I was unable to obtain sufficient appropriate audit evidence the finance cost on D&D provisions, calculated in relation to the D&D stage 1 and stage 2 liabilities, due to numerous limitations placed on the audit of the calculation of these liabilities. Finance cost on D&D provisions is calculated for and recognised on these liabilities and therefore the inability to obtain sufficient appropriate audit evidence for the liabilities impeded my ability to conclude on the amount presented for interest expensed. I could not confirm the amount by alternative means. Consequently, I was unable to determine whether any adjustments were necessary to finance cost on D&D provisions stated at R328 020 000 (2021: R314 947 000) in note 35 of the consolidated and separate financial statements.

Decommissioning and decontamination (D&D) on stage 2 liability

14. I was unable to obtain sufficient appropriate audit evidence for the D&D stage 2 liability due to the lack of sufficient appropriate audit evidence for the group's estimated timing and quantum of cash flows used in determining the liability. I was unable to confirm the liability by alternative means. Consequently, I was unable to determine whether any adjustments were necessary to D&D stage 2 liability, stated at R193 753 000 (2021: R160 321 000, 2020: R121 680 000) in note 25 to the consolidated and separate financial statements. Furthermore, because I was unable to obtain sufficient appropriate audit evidence for the D&D on stage 2 liability, I was also unable to determine by alternative means whether any adjustments were required to the D&D on stage 2 asset, stated at R193 753 000 (2021: R160 321 000) in note 25 to the consolidated and separate financial statements.

Acceptance of decommission and decontamination Stage 1 and 2

15. I was unable to determine whether any adjustments were necessary to the acceptance of D&D stage 1, stated at R129 578 000 (2021: R84 063 000) in note 25to the consolidated and separate financial statements, because I could not obtain sufficient appropriate audit evidence for the D&D stage 1 liability. This related to the lack of appropriate audit evidence to support the group's estimated cash flows in determining the liability, which informs the calculation of the acceptance of D&D stage 1. Furthermore, because I could not obtain sufficient appropriate audit evidence for the D&D stage 1 liability, I was unable to determine whether any adjustments were necessary to government grant income (D&D stage 1), stated at R129 578 000 (2021: R84 063 000) in note 25 to the consolidated and separate financial statements. This item is a movement to release the government grant to profit or loss based on the D&D stage 1 liability.

Trade and other payables

16. Included in trade and other payables is an amount of R38 342 000 relating to Trade and other payables - accrued expenses. The group did not have adequate internal controls to maintain records to support the amount recorded. I was unable to obtain sufficient appropriate audit evidence to substantiate the accrued expenses, stated at R51 422 000 and R38 342 000 in note 20 to the consolidated and separate financial statements, respectively. Consequently, I was unable to determine whether any adjustments were required to the consolidated and separate financial statements arising from trade and other payables – accrued expenses.

Net cash flows from operating activities

17. I was unable to determine whether any adjustments were necessary to the net cash flows from operating activities as required by IAS 7, Statement of Cash flow. This was due to limitation on trade and other payables, and trade and receivables. I was not able to determine the full extent of the errors in the net cash flows from operating activities as it was impracticable to do so. Consequently, I was unable to determine whether any adjustments to cash flows from operating activities as stated at R151 005 000 and R76 714 000 in the consolidated and separate financial statements, respectively.

Net cash flows from investing activities

18. The group incorrectly classified movement in other financial assets as cash flow from investing activities not in accordance with the requirements of IAS 7, Statement of cash Flow as these cash flow related to call account which is cash and cash equivalents. Consequently, net cash flow from investing activities is understated by R118 272 000 (2021: R122 401 000) in the consolidated and separate financial statements, respectively. In addition, due to the incorrect classification, cash and cash equivalents is

understated by R576 053 000 (2021: R457 781 000, 2020: R335 380 000), financial assets at amortised cost is overstated by R576 053 000 (2021: R457 781 000, 2020: R335 380 000), in the consolidated and separate financial statements, respectively.

Commitments

19. The subsidiary Pelchem did not disclose all commitments for both the current and previous year, as required by IAS 16, Property, plant, and equipment, and recalculation differences were identified relating to the remaining commitments at year-end. Consequently, commitments as disclosed in note 41 were understated by R18 538 866 for both the current year and previous year in the consolidated financial statements.

Other matters

20. I draw attention to the matters below. My disclaimer opinion is not modified in respect of these matters.

Material uncertainties

21. The numerous misstatements identified in the consolidated and separate financial statements indicate significant deficiencies in the internal control environment, which compromises the credibility of the accounting records and the reliability of the documentation submitted for auditing. As a result of these deficiencies, the public entity is at increased risk of breaches of legislation, internal policies and processes, and more susceptible to the possible misuse of funds and assets.

22. Furthermore, due to the material uncertainties about the group's ability to continue as a going concern and its financial distress, there is an increased risk that the public entity may not be trading appropriately in accordance with governance prescripts.

Responsibilities of the accounting authority for the financial statements

23. The board of directors, which constitutes the accounting authority is responsible for the preparation and fair presentation of the consolidated and separate financial statements in accordance with the IFRS and the requirements of the Public Finance Management Act 1 of 1999 (PFMA) and the Companies Act, 2008 (Act No. 71 of 2008) (Companies Act) and for such internal control as the accounting authority determines is necessary to enable the preparation of consolidated and separate financial statements that are free from material misstatement, whether due to fraud or error.

24. In preparing the consolidated and separate financial statements, the accounting authority is responsible for assessing the group's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern basis of accounting unless the appropriate governance structure either intends to liquidate group or to cease operations, or has no realistic alternative but to do so.

Auditor-general's responsibilities for the audit of the consolidated and separate financial statements

25. My responsibility is to conduct an audit of the consolidated and separate financial statements in accordance with the International Standards on Auditing and to issue an auditor's report. However, because of the matters described in the basis for disclaimer of opinion section of this auditor's report, I was unable to obtain sufficient appropriate audit evidence to provide a basis for an audit opinion on these financial statements.

26. I am independent of the group in accordance with the International Ethics Standards Board for Accountants' International code of ethics for professional accountants (including International Independence Standards) (IESBA code) as well as other ethical requirements that are relevant to my audit in South Africa. I have fulfilled my other ethical responsibilities in accordance with these requirements and the IESBA code.

Report on the audit of the annual performance report

Introduction and scope

27. In accordance with the Public Audit Act 25 of 2004 (PAA) and the general notice issued in terms thereof, I have a responsibility to report on the usefulness and reliability of the reported performance information against predetermined objectives for the selected programme presented in the annual performance report. I performed procedures to identify material findings but not to gather evidence to express assurance.

28. My procedures address the usefulness and reliability of the reported performance information, which must be based on the entity's approved performance planning documents. I have not evaluated the completeness and appropriateness of the performance indicators included in the planning documents. My procedures do not examine whether the actions taken by the entity enabled service delivery. My procedures do not extend to any disclosures or assertions relating to the extent of achievements in the current year or planned performance strategies and information in respect of future periods that may be included as part of the reported performance information. Accordingly, my findings do not extend to these matters.

29. I evaluated the usefulness and reliability of the reported performance information in accordance with the criteria developed from the performance management and reporting framework, as defined in the general notice, for the following selected programme :

Programme	Pages in the annual performance report
Growth initiatives programme	19 – 27

30. I performed procedures to determine whether the reported performance information was consistent with the approved performance planning documents. I performed further procedures to determine whether the indicators and related targets were measurable and relevant, and assessed the reliability of the reported performance information to determine whether it was valid, accurate and complete.

31. The material findings on the usefulness and reliability of the performance information of the selected programme are as follows:

Growth Initiatives Programme

Key performance indicator (KPI) - D&D programme execution (stage 1): execution of annual plan of action as approved by Department of Mineral Resources and Energy (DMRE)

32. The method of calculation for measuring the planned indicator was not clearly defined and related systems and processes were not adequate to enable consistent measurement and reliable reporting of performance against the predetermined indicator definitions. As a result, limitations were placed on the scope of my work and I was unable to audit the reliability of the achievement of 81.08% reported against the target of 100% in the annual performance report.

Other matter

33. I draw attention to the matter below.

Achievement of planned targets

34. Refer to the annual performance report on pages x to x for information on the achievement of planned targets for the year. This information should be considered in the context of the material findings on the usefulness and reliability of the reported performance information in paragraph 32 of this report.

Report on the audit of compliance with legislation

Introduction and scope

35. In accordance with the PAA and the general notice issued in terms thereof, I have a responsibility to report material findings on the entity's compliance with specific matters in key legislation. I performed procedures to identify findings but not to gather evidence to express assurance.

36. The material findings on compliance with specific matters in key legislation are as follows:

Annual financial statements

37. The financial statements submitted for auditing were not prepared in accordance with the prescribed financial reporting framework and supported by full and proper records, as required by section 55(1) (a) and (b) of the PFMA. Material misstatements of non-current liabilities (Provision) identified by the auditors in the submitted financial statements were corrected and the supporting records were provided subsequently, but the uncorrected material misstatements and supporting records that could not be provided resulted in the financial statements receiving a disclaimer of opinion.

Expenditure management

38. Effective and appropriate steps were not taken to prevent irregular expenditure amounting to R3 169 000 as disclosed in note 49 to the separate financial statements, as required by section 51(1)(b)(ii) of the PFMA. The majority of the irregular expenditure disclosed in the financial statements was caused by the procurement of goods and/or services via an inappropriate procurement method.

39. I was unable to obtain sufficient appropriate audit evidence that the resources of the parent entity were used economically, as required by section 57(b) of the PFMA. Due to the disclaimer of opinion on the consolidated and separate financial statements I was unable to confirm whether assets were used economically, and whether goods and services paid for were actually required, received and used.

Revenue management

40. Effective and appropriate steps were not taken to collect all revenue due, as required by section 51(1) (b)(i) of the PFMA.

Other information

41. The accounting authority is responsible for the other information. The other information comprises the information included in the annual report, which includes the directors' report, the audit committee's report and the company secretary's certificate, as required by the Companies Act. The other information does not include the consolidated and separate financial statements, the auditor's report and those selected programmes presented in the annual performance report that have been specifically reported in this auditor's report.

42. My opinion on the financial statements and findings on the reported performance information and compliance with legislation do not cover the other information and I do not express an audit opinion or any form of assurance conclusion on it.

43. In connection with my audit, my responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated and separate financial statements and the selected programmes presented in the annual performance report, or my knowledge obtained in the audit, or otherwise appears to be materially misstated.

44. As a result of the disclaimer of opinion expressed on the consolidated and separate financial statements, I do not conclude on material misstatements of the other information relating to the consolidated and separate financial statements. If, based on the work I have performed relating to the audit of performance information and compliance with legislation, I conclude that there is a material misstatement of this other information, I am required to report that fact. I have nothing to report in this regard.

Internal control deficiencies

45. I considered internal control relevant to my audit of the consolidated and separate financial statements, reported performance information and compliance with applicable legislation; however, my objective was not to express any form of assurance on it. The matters reported below are limited to the significant internal control deficiencies that resulted in the basis for the disclaimer of opinion, the findings on the annual performance report and the findings on compliance with legislation included in this report.

46. Senior management did not develop adequate action plans to address prior year findings, which resulted in repeat findings being reported in the current year on the annual financial statements, annual performance report and compliance with legislation.

47. The accounting authority and senior management did not exercise adequate oversight responsibility for financial reporting, performance reporting and compliance with laws and regulations and related internal controls. Consequently the following significant internal control deficiencies were identified:

- Inadequate record keeping, which resulted in limitations of scope

48. Management did not ensure that effective internal controls are in place for the preparation of accurate annual financial statements and a performance report that is supported by reliable evidence. This resulted in a disclaimed audit opinion on the consolidated and separate financial statements, material findings on the annual performance report as well as instances of non-compliance with legislation.

Auditor - General

Johannesburg

18 August 2022

AUDITOR - GENERAL
SOUTH AFRICA

Auditing to build public confidence

Consolidated and Separate Statement of Financial Position as at 31 March 2022

		Group			Company		
		2022	2021 Restated *	2020 Restated *	2022	2021 Restated *	2020 Restated *
	Note(s)	R'000	R'000	R'000	R'000	R'000	R'000
Assets							
Non-Current Assets							
Property, plant and equipment	4	1,406,624	1,414,843	1,357,932	1,093,944	1,103,058	1,046,059
Right-of-use assets	16	17,829	16,681	18,070	16,694	15,223	17,060
Goodwill	22	16,585	16,584	16,584	-	-	-
Intangible assets	5	17,971	21,778	27,510	506	1,360	1,493
Investments in subsidiaries	6	-	-	-	220,701	220,701	220,701
Investment in associate	7	8,437	6,764	4,927	2	2	2
Financial assets at fair value	9	299,802	265,203	219,226	299,767	265,174	219,201
Retirement benefit asset	17	36,908	8,252	4,903	17,872	9,229	4,903
Deferred tax	10	108,343	126,708	127,540	-	-	-
Decommissioning and Decontamination of Stage 1	25	4,762,140	4,597,130	4,236,762	4,762,140	4,597,130	4,236,762
Decommissioning and Decontamination of Stage 2	25	193,753	160,321	121,680	193,753	160,321	121,680
Vaalputs After Care	26	22,845	23,582	24,318	22,845	23,582	24,318
		6,891,237	**6,657,846**	**6,159,452**	**6,628,224**	**6,395,780**	**5,892,179**
Current Assets							
Inventories	11	320,450	364,599	364,916	51,206	53,524	65,187
Loans to group companies		-	-	-	-	-	84,102
Financial Assets at Amortised Cost (Restricted Cash)	23	576,053	457,781	335,380	576,053	457,781	335,380
Trade and other receivables	12	279,549	349,331	319,446	106,222	176,297	59,635
Derivatives	24	2,748	2,149	-	-	-	-
Prepayments		61,858	57,435	2,661	58,662	46,462	194
Current tax receivable		11,715	10,878	12,917	-	-	-
Cash and cash equivalents	13	228,423	171,759	202,872	33,819	21,151	16,630
		1,480,796	**1,413,932**	**1,238,192**	**825,962**	**755,215**	**561,128**
Non-current assets held for sale and assets of disposal groups	14	-	716	180	-	-	-
Total Assets		**8,372,033**	**8,072,494**	**7,397,824**	**7.454,186**	**7,150,995**	**6,453,307**

Consolidated and Separate Statement of Financial Position as at 31 March 2022

		Group			Company		
		2022	2021 Restated *	2020 Restated *	2022	2021 Restated *	2020 Restated *
	Note(s)	R'000	R'000	R'000	R'000	R'000	R'000
Equity and Liabilities							
Equity							
Equity Attributable to Equity Holders of Parent							
Share capital	15	2,205	2,205	2,205	2,205	2,205	2,205
Reserves		767,331	733,874	622,713	747,110	716,301	602,756
Accumulated loss		(333,832)	(268,774)	165,502	(918,486)	(830,380)	(516,624)
		435,704	467,305	790,420	(169,171)	(111,874)	88,337
Non-controlling interest		68,483	62,202	58,834	-	-	-
		504,187	**529,507**	**849,254**	**(169,171)**	**(111,874)**	**88,337**
Liabilities							
Non-Current Liabilities							
Vaalputs Afetr Care Liability	26	52,821	48,999	46,592	52,821	48,999	46,592
Leases liabilities	16	2,752	606	2,163	2,325	989	1,841
Retirement benefit obligation	17	299,289	278,141	270,281	256,755	271,699	249,741
Deferred income	18	635,860	608,634	583,999	635,860	608,634	583,999
Deferred tax	10	1,648	1,474	2,244	-	-	-
Provisions	19	862,436	805,114	592,661	737,456	685,459	502,932
Investment contributions for future liabilities	29	62,307	58,749	45,930	62,307	58,749	45,930
Decommissioning and Decontamination of Stage 1	25	4,762,140	4,597,130	4,236,762	4,762,140	4,597,130	4,236,762
Decommissioning and Decontamination of Stage 2	25	193,753	160,321	121,680	193,753	160,321	121,680
		6,873,006	**6,559,168**	**5,902,312**	**6,703,417**	**6,431,980**	**5,789,477**
Current Liabilities							
Trade and other payables	20	250,294	240,125	217,120	146,648	121,380	136,292
Loans from group companies	8	-	-	-	40,483	49,106	45,544
Loans from shareholders		-	23	21	-	-	-

Consolidated and Separate Statement of Financial Position as at 31 March 2022

		Group			Company		
		2022	2021	2020	2022	2021	2020
			Restated *	Restated *		Restated *	Restated *
	Note(s)	R'000	R'000	R'000	R'000	R'000	R'000
Borrowings	28	-	2,043	5,010	-	-	-
Derivatives	24	805	10,895	11,543	805	10,895	83
Leases liabilities	16	1,552	1,602	3,967	1,162	2,067	3,411
Retirement benefit obligation	17	26,741	43,556	25,128	24,183	23,915	24,082
Deferred income	18	382,269	276,421	125,940	382,269	276,421	125,940
Current tax payable		886	955	-	-	-	-
Provisions	19	130,062	133,380	76,074	75,865	86,313	51,485
Payment received in advance		188,224	260,792	157,430	248,525	260,792	188,468
Bank overdraft	13	14,007	13,976	23,909	-	-	188
		994,840	**983,768**	**646,142**	**919,940**	**830,889**	**575,493**
Liabilities of disposal groups	14	-	51	116	-	-	-
Total Liabilities		**7,867,846**	**7,542,987**	**6,548,570**	**7,623,357**	**7,262,869**	**6,364,970**
Total Equity and Liabilities		**8,372,033**	**8,072,494**	**7,397,824**	**7,454,186**	**7,150,995**	**6,453,307**

Consolidated and Separate Statement of Profit or Loss and Other Comprehensive Income

		Group		Company	
		2022	2021	2022	2021
			Restated *		Restated *
	Note(s)	R'000	R'000	R'000	R'000
Continuing operations					
Revenue	30	2,064,135	1,670,802	1,132,350	1,053,231
Cost of sales	31	(971,603)	(582,404)	(265,161)	(182,446)
Gross profit		**1,092,532**	**1,088,398**	**867,189**	**870,785**
Fair value adjustments	36	4,843	19,124	4,843	19,124
Other operating income	32	44,359	42,434	21,379	11,044
Other operating losses		(18,255)	-	(8,186)	-
Expected credit (losses) / reversals	12	(39,583)	17,040	(66,723)	28,452
Other operating expenses		(919,227)	(1,353,725)	(813,799)	(1,115,777)
Government Grant Income (Decommissioning & Decontamination Stage 1 & 2)	25	(129,578)	84,063	(129,578)	84,063
Acceptance of Decommission and Decontamination Stage 1 & 2	25	129,578	(84,063)	129,578	(84,063)
Administration and fees		(251,980)	(257,870)	(148,283)	(137,392)
Operating loss	33	**(87,311)**	**(444,599)**	**(143,580)**	**(323,764)**
Investment income	34	375,092	360,028	371,656	349,189
Finance costs	35	(336,666)	(316,359)	(330,856)	(317,390)
Income from equity accounted investments		2,632	2,104	-	-
Loss before taxation		**(46,253)**	**(398,826)**	**(102,780)**	**(291,965)**
Taxation	37	(25,027)	(9,048)	-	-
Loss from continuing operations		**(71,280)**	**(407,874)**	**(102,780)**	**(291,965)**
Discontinued operations					
(Loss) profit from discontinued operations		(60)	(66)	-	-
Loss for the year		**(71,340)**	**(407,940)**	**(102,780)**	**(291,965)**
Other comprehensive income:					
Items that will not be reclassified to profit or loss:					
Remeasurements on net defined benefit liability/asset	17	17,507	(25,593)	14,676	(21,791)
Gains on property revaluation	4	30,948	113,495	30,645	113,207

Consolidated and Separate Statement of Profit or Loss and Other Comprehensive Income

		Group		Company	
		2022	2021	2022	2021
			Restated *		Restated *
	Note(s)	R'000	R'000	R'000	R'000
Income tax relating to items that will not be reclassified	37	(543)	1,532	-	-
Total items that will not be reclassified to profit or loss		**47,912**	**89,434**	**45,321**	**91,416**
Items that may be reclassified to profit or loss:					
Exchange differences on translating foreign operations	21	-	(373)	-	-
Gains on hedge of net investment in foreign operations	21	65	-	-	-
Fair value through other comprehensive income adjustments	21	164	141	164	(56)
Total items that may be reclassified to profit or loss		**229**	**(232)**	**164**	**(56)**
Other comprehensive income for the year net of taxation	38	**48,141**	**89,202**	**45,485**	**91,360**
Total comprehensive loss for the year		**(23,199)**	**(318,738)**	**(57,295)**	**(200,605)**
Loss attributable to:					
Owners of the parent		(79,722)	(412,485)	(102,780)	(291,965)
Non-controlling interest		8,382	4,545	-	-
		(71,340)	**(407,940)**	**(102,780)**	**(291,965)**

Consolidated and Separate Statement of Profit or Loss and Other Comprehensive Income

		Group		Company	
		2022	2021	2022	2021
			Restated *		Restated *
	Note(s)	R'000	R'000	R'000	R'000
Loss attributable to:					
Owners of the parent:					
From continuing operations		(79,689)	(412,723)	(102,780)	(291,965)
From discontinued operations		(33)	238	-	-
		(79,722)	**(412,485)**	**(102,780)**	**(291,965)**
Non-controlling interest:					
From continuing operations		8,409	4,849	-	-
From discontinued operations		(27)	(304)	-	-
		8,382	**4,545**	**-**	**-**
Total comprehensive loss attributable to:					
Owners of the parent		(31,601)	(323,115)	(57,295)	(200,605)
Non-controlling interest		8,402	4,377	-	-
		(23,199)	**(318,738)**	**(57,295)**	**(200,605)**

Consolidated and Separate Statement of Changes in Equity

	Share capital	Foreign currency translation reserve	Revaluation reserve	Reserve for valuation of investments	Reserve for valuation of liabilities	Total reserves	Accumulated loss	Total attributable to equity holders of the group / company	Non-controlling interest	Total equity
	R'000	R'000	R'000	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Group										
Opening balance as previously reported	2,205	(1,382)	615,056	665	10,811	625,150	165,502	792,857	58,834	851,691
Adjustments										
Prior period error - Note 45	-	-	(1,756)	(474)	(207)	(2,437)	-	(2,437)	-	(2,437)
Restated* Balance at 01 April 2020 as restated	**2,205**	**(1,382)**	**613,300**	**191**	**10,604**	**622,713**	**165,502**	**790,420**	**58,834**	**849,254**
Loss for the year	-	-	-	-	-	-	(412,485)	(412,485)	4,545	(407,940)
Other comprehensive income	-	(373)	113,495	141	(2,102)	111,161	(21,791)	89,370	(168)	89,202
Total comprehensive Loss for the year	**-**	**(373)**	**113,495**	**141**	**(2,102)**	**111,161**	**(434,276)**	**(323,115)**	**4,377**	**(318,738)**
Dividends	-	-	-	-	-	-	-	-	(1,009)	(1,009)
Balance at 01 April 2021 as restated	**2,205**	**(1,755)**	**726,795**	**332**	**8,502**	**733,874**	**(268,774)**	**467,305**	**62,202**	**529,507**
Loss for the year	-	-	-	-	-	-	(79,722)	(79,722)	8,382	(71,340)
Other comprehensive income	-	45	30,942	164	2,306	33,457	14,664	48,121	20	48,141
Total comprehensive Loss for the year	**-**	**45**	**30,942**	**164**	**2,306**	**33,457**	**(65,058)**	**(31,601)**	**8,402**	**(23,199)**
Dividends	-	-	-	-	-	-	-	-	(2,121)	(2,121)
Balance at 31 March 2022	**2,205**	**(1,710)**	**757,737**	**496**	**10,808**	**767,331**	**(333,832)**	**435,704**	**68,483**	**504,187**
Note(s)	15	38	21&35	27	27		38			

Consolidated and Separate Statement of Changes in Equity

	Share capital	Foreign currency translation reserve	Revaluation reserve	Reserve for valuation of investments	Reserve for valuation of liabilities	Total reserves	Accumulated loss	Total attributable to equity holders of the group / company	Non-controlling interest	Total equity
	R '000	R '000	R '000	R '000	R '000	R '000	R '000	R '000	R '000	R '000
Company										
Restated* Balance at 01 April 2020	**2,205**	**-**	**602,565**	**191**	**-**	**602,756**	**(516,624)**	**88,337**	**-**	**88,337**
Loss for the year	-	-	-	-	-	-	(291,965)	(291,965)	-	(291,965)
Other comprehensive income	-	-	113,404	141	-	113,545	(21,791)	91,754	-	91,754
Total comprehensive Loss for the year	**-**	**-**	**113,404**	**141**	**-**	**113,545**	**(313,756)**	**(200,211)**	**-**	**(200,211)**
Balance at 01 April 2021 as restated	**2,205**	**-**	**715,969**	**332**	**-**	**716,301**	**(830,382)**	**(111,876)**	**-**	**(111,876)**
Loss for the year	-	-	-	-	-	-	(102,780)	(102,780)	-	(102,780)
Other comprehensive income	-	-	30,645	164	-	30,809	14,676	45,485	-	45,485
Total comprehensive Loss for the year	**-**	**-**	**30,645**	**164**	**-**	**30,809**	**(88,104)**	**(57,295)**	**-**	**(57,295)**
Balance at 31 March 2022	**2,205**	**-**	**746,614**	**496**	**-**	**747,110**	**(918,486)**	**(169,171)**	**-**	**(169,171)**
Note(s)	15	38	21&38				38			

The accounting policies on pages 25 to 49 and the notes on pages 50 to 139 form an integral part of the annual financial statements.

Consolidated and Separate Statement of Cash Flows

		Group		Company	
		2022	2021	2022	2021
			Restated *		Restated *
	Note(s)	R'000	R'000	R'000	R'000
Cash flows from operating activities					
Cash receipts from customers		2,106,671	1,954,456	1,136,710	2,479,044
Cash paid to suppliers and employees		(1,994,179)	(2,006,195)	(1,101,160)	(2,620,909)
Cash generated from/(used in) from operations	39	112,492	(51,739)	35,550	(141,865)
Interest income	35	45,720	44,327	31,863	33,859
Finance costs	35	(8,559)	(1,412)	(2,472)	(2,120)
Dividends		1,352	957	11,773	383
Net cash generated from/(used in) operating activities		**151,005**	**(7,867)**	**76,714**	**(109,743)**
Cash flows from investing activities					
Purchase of property, plant and equipment	4	(67,180)	(38,573)	(30,875)	(18,574)
Movement in assets from disposal groups	14	716	(536)	-	-
Intangible assets additions	5	(662)	(847)	(158)	(538)
Loans advanced to group companies		-	-	-	84,102
Movement in other financial assets	9	(148,418)	(150,387)	(147,858)	(149,109)
Net cash used in investing activities		**(215,544)**	**(190,343)**	**(178,891)**	**(84,119)**
Cash flows from financing activities					
Repayment of loans from group companies	8	(23)	-	(8,623)	3,562
Repayment of lease liabilities	16	(1,132)	(6,218)	(3,074)	(3,739)
Other financial liabilities	28	(10,090)	(648)	(10,090)	10,812
Movement in deferred Grant Income	18	3,558	12,819	3,558	12,819
Deferred income	18	133,074	175,116	133,074	175,117
Borrowings	28	(2,043)	(2,965)	-	-
Dividends paid		(2,121)	(1,009)	-	-
Liability of disposal group	14	(51)	(65)	-	-
Net cash generated from financing activities		**121,172**	**177,030**	**114,845**	**198,571**
Total cash movement for the year		**56,633**	**(21,180)**	**12,668**	**4,709**
Cash at the beginning of the year	13	157,783	178,963	21,151	16,442
Total cash at end of the year	13	**214,416**	**157,783**	**33,819**	**21,151**

Accounting Policies

1. Significant accounting policies

The principal accounting policies applied in the preparation of these consolidated and separate annual financial statements are set out below.

1.1 Basis of preparation

The consolidated and separate annual financial statements have been prepared on the going concern basis in accordance with, and in compliance with, International Financial Reporting Standards ("IFRS"), the requirements of the Public Finance Management Act of South Africa, 1999 (Act No.1 of 1999) (PFMA), International Financial Reporting Interpretations Committee ("IFRIC") interpretations issued and effective at the time of preparing these annual financial statements and the Companies Act, 2008(Act No 71 of 2008) of South Africa, as amended.

These annual financial statements comply with the requirements of and the Financial Reporting Pronouncements as issued by the Financial Reporting Standards Council.

The Annual Financial Statements have been prepared on the historic cost basis, except for certain properties and financial instruments that are measured at revalued amounts or fair values, as explained in the accounting policies below. Historical cost is generally based on the fair value of the consideration given in exchange for goods and services. They are presented in Rands, which is the group and company's functional currency.

Accordingly, the Group has prepared Annual Financial Statements, which comply with IFRS applicable for periods ending on or after 31 March 2022, together with the comparative period data as at and for the year ended 31 March 2022, as described in the accounting policies.

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date, regardless of whether that price is directly observable or estimated using another valuation technique. In estimating the fair value of an asset or a liability, the Group takes into account the characteristics of the asset or liability if market participants would take those characteristics into account when pricing the asset or liability at the measurement date. Fair value for measurement and/or disclosure purpose in these consolidated financial statements is determined on such a basis, except for share-based payment transactions that are within the scope of IFRS 2, leasing transactions that are within the scope of IFRS 16, and measurements that have some similarities to fair value but are not fair value, such as net realisable value in IAS 2 or value in use in IAS 36.

In addition, for financial reporting purposes, fair value measurements are categorised into Level 1, 2 or 3 based on the degree to which the inputs to the fair values measurements are observable and the significance of the inputs to the fair value measurements in its entirety, which are described as follows:

- Level 1 Inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities that the entity can access at the measurement date;
- Level 2 Inputs are inputs, other than quoted prices included within Level 1, that are observable for the asset or liability, either directly or indirectly; and
- Level 3 inputs are observable inputs for the asset or liability.

The principal accounting policies are set out below.

1.2 Consolidation

Basis of consolidation

The consolidated annual financial statements incorporate the annual financial statements of Necsa and its subsidiaries. Subsidiaries are entities (including structured entities) which are controlled by the group.

Control is achieved when Necsa or its Subsidiaries:

- has power over the investee;
- is exposed, or has rights, to variable returns from its involvement with the investee; and
- has the ability to use its power to affect its returns.

When Necsa or its Subsidiaries has less than a majority of the voting rights of an investee, it has power over the investee when the voting rights are sufficient to give it the practical ability to direct the relevant activities of the investee unilaterally. Necsa considers all relevant facts and circumstances in assessing whether or not Necsa or its Subsidiaries' voting rights in an investee are sufficient to give power, including:

- the size of the Company's holding of voting rights relative to the size and dispersion of holdings of the other vote holders;
- potential voting rights held by the Company, other vote holders or other parties;
- rights arising from other contractual arrangements; and
- any additional facts and circumstances that indicate that the Company has, or does not have, the current ability to direct the relevant activities at the time that decisions need to be made, including voting patterns at previous shareholders' meetings.

Consolidation of a subsidiary begins when Necsa or its Subsidiaries obtains control over the subsidiary and ceases when Necsa or its Subsidiaries loses control of the subsidiary. Specifically, income and expenses of a subsidiary acquired or disposed of during the year are included in the consolidated statement of profit or loss and other comprehensive income from the date Necsa or its Subsidiaries gains control until the date when Necsa or its Subsidiaries ceases to control the subsidiary.

Profit or loss and each component of other comprehensive income are attributed to the owners of Necsa and to the non-controlling interests. Total comprehensive income of subsidiaries is attributed to the owners of the Necsa and to the non-controlling interests.

All intragroup assets and liabilities, equity, income, expenses and cash flows relating to transactions between members of the Group are eliminated in full on consolidation.

1.3 Investment in associate

An associate is an entity over which the group has significant influence and which is neither a subsidiary nor a joint arrangement. Significant influence is the power to participate in the financial and operating policy decisions of the investee but is not control or joint control over those policies. It generally accompanies a shareholding of between 20% and 50% of the voting rights.

The requirements of IFRS 9 are applied to determine whether it is necessary to recognise any impairment loss with respect to the Group's investment in an associate. The results of assets and liabilities of associates are incorporated in these consolidated financial statements using the equity method of accounting, except when the investment is classified as held for sale, in which case it is accounted for in accordance with IFRS 5 Noncurrent Assets Held for Sale and Discontinued Operations. Under the equity method, an investment in an associate is initially recognised in the consolidated statement of financial position at cost and adjusted thereafter to recognise the Group's share of the profit or loss and other comprehensive income of the associate. When the Group's share of losses of an associate exceeds the Group's interest in that associate (which includes any long-term interests that, in substance, form part of the Group's net investment in the associate), the Group discontinues recognising its share of further losses. Additional losses are classified as liabilities when recognised, only to the extent that the Group has incurred legal or constructive obligations or made payments on behalf of the associate.

When necessary, the entire carrying amount of the investment (including goodwill) is tested for impairment in accordance with IAS 36 Impairment of Assets as a single asset by comparing its recoverable amount (higher of value in use and fair value less costs to sell) with its carrying amount. Any impairment loss recognised forms part of the carrying amount of the investment. Any reversal of that impairment loss is recognised in accordance with IAS 36 to the extent that the recoverable amount of the investment subsequently increases.

When a Group entity transacts with its associate, profits and losses resulting from the transactions with the associate are recognised in the Group's consolidated financial statements only to the extent of interests in the associate that are not related to the Group.

1.4 Investment property

Investment properties are properties held to earn rentals.

Investment property is initially recognised at cost. Transaction costs are included in the initial measurement.

Costs include costs incurred initially and costs incurred subsequently to add to, or to replace a part of, or service a property. If a replacement part is recognised in the carrying amount of the investment property, the carrying amount of the replaced part is derecognised.

Fair value

Subsequent to initial measurement investment property is measured at fair value.

A gain or loss arising from a change in fair value is included in net profit or loss for the period in which it arises.

An investment property is derecognised upon disposal or when the investment property is permanently withdrawn from use and no future economic benefits are expected from the disposal. Any gain or loss arising on derecognition of the property (calculated as the difference between the net disposal proceeds and the carrying amount of the asset) is included in profit or loss in the period in which the property is derecognised.

1.5 Property, plant and equipment

Property, plant and equipment is initially measured at cost.

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

The initial estimate of the costs of dismantling and removing an item and restoring the site on which it is located is also included in the cost of property, plant and equipment, where the group is obligated to incur such expenditure, and where the obligation arises as a result of acquiring the asset or using it for purposes other than the production of inventories.

Plant and equipment is stated at cost less accumulated depreciation and any impairment losses.

Land and buildings is carried at revalued amount, being the fair value at the date of revaluation less any subsequent accumulated depreciation and subsequent accumulated impairment losses.

Revaluations are made with sufficient regularity such that the carrying amount does not differ materially from that which would be determined using fair value at the end of the reporting year.

The frequency of revaluations depends upon the changes in fair values of the items of property, plant and equipment being revalued. Some items of property, plant and equipment experience significant and volatile changes in fair value, thus necessitating annual revaluation. Such frequent revaluations are unnecessary for items of property, plant and equipment with only insignificant changes in fair value. Instead, it may be necessary to revalue the item every three to five years.

When an item of property, plant and equipment is revalued, any accumulated depreciation at the date of the revaluation is eliminated against the gross carrying amount of the asset.

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

Any increase in an asset's carrying amount, as a result of a revaluation, is recognised in profit or loss in the current year. The decrease is recognised in other comprehensive income to the extent of any credit balance existing in the revaluation reserve in respect of that asset. The decrease recognised in other comprehensive income reduces the amount accumulated in the revaluation reserve in equity.

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

Property, plant and equipment is depreciated on the straight line basis over their expected useful lives to their estimated residual value.

1.5 Property, plant and equipment (continued)

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

Item	Average useful life
Buildings	10 - 50 years
Land	indefinite
Plant	5 - 50 years
Furniture and fixtures	2 - 22 years
Motor vehicles and transport containers	2 - 26 years
Office equipment	2 - 22 years
IT equipment	2 - 22 years
Research facilities	2 - 22 years
Leasehold improvements	2 - 10 years
Machinery and equipment	2 - 22 years
Component spares	2- 10 years
Small capital items (less than R7000)	Not applicable - Depreciated immediately

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

The depreciation charge for each year is recognised in profit or loss unless it is included in the carrying amount of another asset.

An item of property, plant and equipment is derecognised upon disposal or when no future economic benefits are expected from its continued use.

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

1.6 Intangible assets

An intangible asset is recognised when:

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

Intangible assets are initially recognised at cost.

Internally generated intangible assets - research and development expenditure.

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

1.6 Intangible assets (continued)

An intangible asset arising from development (or from the development phase of an internal project) is recognised when all of the following have been demonstrated:

- it is technically feasible to complete the asset so that it will be available for use or sale.
- the intention to complete the intangible asset and use or sell it.
- the ability to use or sell the intangible asset.
- it will generate probable future economic benefits.
- how the intangible asset will generate probable future economic benefits.
- the availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset.
- the ability to measure reliably the expenditure attributable to the intangible asset during its development.

The amount initially recognised for internally-generated intangible assets is the sum of the expenditure incurred from the date when the intangible asset first meets the recognition criteria listed above. Where no internally-generated intangible asset can be recognised, development expenditure is recognised in profit or loss in the period in which it is incurred.

Subsequent to initial recognition, internally-generated intangible assets are reported at cost less accumulated amortisation and accumulated impairment losses, on the same basis as intangible assets that are acquired separately.

The amortisation period and the amortisation method for intangible assets are reviewed at the end of each reporting period.

Re-assessing the useful life of an intangible asset with a finite useful life after it was classified as indefinite is an indicator that the asset may be impaired. As a result the asset is tested for impairment and the remaining carrying amount is amortised over its useful life.

Internally generated brands, mastheads, publishing titles, customer lists and items similar in substance are not recognised as intangible assets.

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

Item	Useful lives
Patents, trademarks and other rights	20 years
Computer software	3 years

1.7 Investments in subsidiaries

Company financial statements

In the Company's separate Annual Financial Statements, investments in subsidiaries are carried at cost less any accumulated impairment.

The cost of an investment in a subsidiary is the aggregate of:

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

1.8 Investments in associates

Company

An investment in an associate is carried at cost less any accumulated impairment.

1.9 Financial instruments

Broadly, the classification possibilities, which are adopted by the group, as applicable, are as follows:

Financial assets which are equity instruments:

- Mandatorily at fair value through profit or loss; or
- Designated as at fair value through other comprehensive income. (This designation is not available to equity instruments which are held for trading or which are contingent consideration in a business combination).

Financial assets which are debt instruments:

- Amortised cost. (This category applies only when the contractual terms of the instrument give rise, on specified dates, to cash flows that are solely payments of principal and interest on principal, and where the instrument is held under a business model whose objective is met by holding the instrument to collect contractual cash flows); or
- Fair value through other comprehensive income. (This category applies only when the contractual terms of the instrument give rise, on specified dates, to cash flows that are solely payments of principal and interest on principal, and where the instrument is held under a business model whose objective is achieved by both collecting contractual cash flows and selling the instruments); or
- Mandatorily at fair value through profit or loss. (This classification automatically applies to all debt instruments which do not qualify as at amortised cost or at fair value through other comprehensive income); or
- Designated at fair value through profit or loss. (This classification option can only be applied when it eliminates or significantly reduces an accounting mismatch).

Derivatives which are not part of a hedging relationship:

- Mandatorily at fair value through profit or loss.

Financial liabilities:

- Amortised cost; or
- Mandatorily at fair value through profit or loss. (This applies to contingent consideration in a business combination or to liabilities which are held for trading); or
- Designated at fair value through profit or loss. (This classification option can be applied when it eliminates or significantly reduces an accounting mismatch; the liability forms part of a group of financial instruments managed on a fair value basis; or it forms part of a contract containing an embedded derivative and the entire contract is designated as at fair value through profit or loss).

Note 46 Financial instruments and risk management presents the financial instruments held by the group based on their specific classifications.

All regular way purchases or sales of financial assets are recognised and derecognised on a trade date basis. Regular way purchases or sales are purchases or sales of financial assets that require delivery of assets within the time frame established by regulation or convention in the marketplace.

The specific accounting policies for the classification, recognition and measurement of each type of financial instrument held by the group are presented below:

1.9 Financial instruments (continued)

Loans receivable at amortised cost

Classification

Loans to group companies , are classified as financial assets subsequently measured at amortised cost.

They have been classified in this manner because the contractual terms of these loans give rise, on specified dates to cash flows that are solely payments of principal and interest on the principal outstanding, and the group's business model is to collect the contractual cash flows on these loans.

Recognition and measurement

Loans receivable are recognised when the group becomes a party to the contractual provisions of the loan. The loans are measured, at initial recognition, at fair value plus transaction costs, if any.

They are subsequently measured at amortised cost.

The amortised cost is the amount recognised on the loan initially, minus principal repayments, plus cumulative amortisation (interest) using the effective interest method of any difference between the initial amount and the maturity amount, adjusted for any loss allowance.

Application of the effective interest method

Interest income is calculated using the effective interest method, and is included in profit or loss in investment income (note 34).

The application of the effective interest method to calculate interest income on a loan receivable is dependent on the credit risk of the loan as follows:

- The effective interest rate is applied to the gross carrying amount of the loan, provided the loan is not credit impaired. The gross carrying amount is the amortised cost before adjusting for a loss allowance.
- If a loan was not purchased or originally credit-impaired, but it has subsequently become credit-impaired, then the effective interest rate is applied to the amortised cost of the loan in the determination of interest. If, in subsequent periods, the loan is no longer credit impaired, then the interest calculation reverts to applying the effective interest rate to the gross carrying amount.

Loans denominated in foreign currencies

When a loan receivable is denominated in a foreign currency, the carrying amount of the loan is determined in the foreign currency. The carrying amount is then translated to the Rand equivalent using the spot rate at the end of each reporting period. Any resulting foreign exchange gains or losses are recognised in profit or loss in the other operating gains (losses).

Impairment

The group recognises a loss allowance for expected credit losses on all loans receivable measured at amortised cost. The amount of expected credit losses is updated at each reporting date to reflect changes in credit risk since initial recognition of the respective loans.

The group measures the loss allowance at an amount equal to lifetime expected credit losses (lifetime ECL) when there has been a significant increase in credit risk since initial recognition. If the credit risk on a loan has not increased significantly since initial recognition, then the loss allowance for that loan is measured at 12 month expected credit losses (12 month ECL).

1.9 Financial instruments (continued)

Lifetime ECL represents the expected credit losses that will result from all possible default events over the expected life of a loan. In contrast, 12 month ECL represents the portion of lifetime ECL that is expected to result from default events on a loan that are possible within 12 months after the reporting date.

In order to assess whether to apply lifetime ECL or 12 month ECL, in other words, whether or not there has been a significant increase in credit risk since initial recognition, the group considers whether there has been a significant increase in the risk of a default occurring since initial recognition rather than at evidence of a loan being credit impaired at the reporting date or of an actual default occurring.

Definition of default

For purposes of internal credit risk management purposes, the group consider that a default event has occurred if there is either a breach of financial covenants by the counterparty, or if internal or external information indicates that the counterparty is unlikely to pay its creditors in full (without taking collateral into account).

Irrespective of the above analysis, the group considers that default has occurred when a loan instalment is more than 90 days past due unless there is reasonable and supportable information to demonstrate that a more lagging default criterion is more appropriate.

Write off policy

The group writes off a loan when there is information indicating that the counterparty is in severe financial difficulty and there is no realistic prospect of recovery, e.g. when the counterparty has been placed under liquidation or has entered into bankruptcy proceedings. Loans written off may still be subject to enforcement activities under the group recovery procedures, taking into account legal advice where appropriate. Any recoveries made are recognised in profit or loss.

Credit risk

Details of credit risk related to loans receivable are included in the specific notes and the financial instruments and risk management (note 46).

Derecognition

Refer to the "derecognition" section of the accounting policy for the policies and processes related to derecognition.

Any gains or losses arising on the derecognition of a loan receivable is included in profit or loss.

Debt instruments at fair value through other comprehensive income

Classification

The group holds certain investments in bonds and debentures which are classified as subsequently measured at fair value through other comprehensive income (note 38).

They have been classified in this manner because the contractual terms of these debt instruments give rise, on specified dates to cash flows that are solely payments of principal and interest on the principal outstanding, and the objectives of the group's business model is achieved by both collecting the contractual cash flows on these instruments and by selling them.

1.9 Financial instruments (continued)

Recognition and measurement

These debt instruments are recognised when the group becomes a party to the contractual provisions. They are measured, at initial recognition, at fair value plus transaction costs, if any.

They are subsequently measured at fair value.

Even though they are measured at fair value, the group determines the amortised cost of each instrument as if they were measured at amortised cost. The difference, at reporting date, between the amortised cost and the fair value of the debt instruments, is recognised in other comprehensive income and accumulated in equity in the reserve for valuation of investments.

The amortised cost is the amount recognised on the loan initially, minus principal repayments, plus cumulative amortisation (interest) using the effective interest method of any difference between the initial amount and the maturity amount, adjusted for any loss allowance.

Application of the effective interest method

Interest income is calculated using the effective interest method, and is included in profit or loss in investment income (note 34).

The application of the effective interest method to calculate interest income on debt instruments at fair value through other comprehensive income is dependent on the credit risk of the instrument as follows:

- The effective interest rate is applied to the gross carrying amount of the instrument, provided the instrument is not credit impaired. The gross carrying amount is the amortised cost before adjusting for a loss allowance.
- If a debt instrument was not purchased or originally credit-impaired, but it has subsequently become credit-impaired, then the effective interest rate is applied to the amortised cost of the instrument in the determination of interest. If, in subsequent periods, the instrument is no longer credit impaired, then the interest calculation reverts to applying the effective interest rate to the gross carrying amount.

Debt instruments denominated in foreign currencies

When a debt instrument measured at fair value through other comprehensive income is denominated in a foreign currency, the amortised cost and the fair value (carrying amount) of the investment is determined in the foreign currency. The amortised cost and fair value is then translated to the Rand equivalent using the spot rate at the end of each reporting period. Any foreign exchange gains or losses arising on the amortised cost of the instrument are recognised in profit or loss in the other operating gains (losses). The remaining foreign exchange gains or losses relate to the valuation adjustment and are included in other comprehensive income and are accumulated in equity in the reserve for valuation of investments.

Details of foreign currency risk exposure and the management thereof are provided in the specific loan notes and in the financial instruments and risk management note (note 46).

Impairment

The group recognises a loss allowance for expected credit losses on all debt instruments measured at fair value through other comprehensive income. The amount of expected credit losses is updated at each reporting date to reflect changes in credit risk since initial recognition of the respective instruments.

1.9 Financial instruments (continued)

The group measures the loss allowance at an amount equal to lifetime expected credit losses (lifetime ECL) when there has been a significant increase in credit risk since initial recognition. If the credit risk on a debt instrument has not increased significantly since initial recognition, then the loss allowance for that instrument is measured at 12 month expected credit losses (12 month ECL).

Lifetime ECL represents the expected credit losses that will result from all possible default events over the expected life of the instrument. In contrast, 12 month ECL represents the portion of lifetime ECL that is expected to result from default events that are possible within 12 months after the reporting date.

In order to assess whether to apply lifetime ECL or 12 month ECL, in other words, whether or not there has been a significant increase in credit risk since initial recognition, the group considers whether there has been a significant increase in the risk of a default occurring since initial recognition rather than at evidence of a debt instrument being credit impaired at the reporting date or of an actual default occurring.

Credit risk

Details of credit risk related to debt instruments at fair value through other comprehensive income are included in the specific notes and the financial instruments and risk management (note 46).

Derecognition

Refer to the derecognition section of the accounting policy for the policies and processes related to derecognition.

On derecognition of a debt instrument at fair value through other comprehensive income, the cumulative gain or loss on that instrument which was previously accumulated in equity in the reserve for valuation of investments is reclassified to profit or loss.

Trade and other receivables

Classification

Trade and other receivables, excluding, when applicable, VAT and prepayments, are classified as financial assets subsequently measured at amortised cost (note 12).

They have been classified in this manner because their contractual terms give rise, on specified dates to cash flows that are solely payments of principal and interest on the principal outstanding, and the group's business model is to collect the contractual cash flows on trade and other receivables.

Recognition and measurement

Trade and other receivables are recognised when the group becomes a party to the contractual provisions of the receivables. They are measured, at initial recognition, at fair value plus transaction costs, if any.

They are subsequently measured at amortised cost.

The amortised cost is the amount recognised on the receivable initially, minus principal repayments, plus cumulative amortisation (interest) using the effective interest method of any difference between the initial amount and the maturity amount, adjusted for any loss allowance.

1.9 Financial instruments (continued)

Application of the effective interest method

For receivables which contain a significant financing component, interest income is calculated using the effective interest method, and is included in profit or loss in investment income (note 34).

The application of the effective interest method to calculate interest income on trade receivables is dependent on the credit risk of the receivable as follows:

- The effective interest rate is applied to the gross carrying amount of the receivable, provided the receivable is not credit impaired. The gross carrying amount is the amortised cost before adjusting for a loss allowance.
- If a receivable was not purchased or originally credit-impaired, but it has subsequently become credit-impaired, then the effective interest rate is applied to the amortised cost of the receivable in the determination of interest. If, in subsequent periods, the receivable is no longer credit impaired, then the interest calculation reverts to applying the effective interest rate to the gross carrying amount.

Trade and other receivables denominated in foreign currencies

When trade and other receivables are denominated in a foreign currency, the carrying amount of the receivables are determined in the foreign currency. The carrying amount is then translated to the Rand equivalent using the spot rate at the end of each reporting period. Any resulting foreign exchange gains or losses are recognised in profit or loss in other operating gains (losses).

Details of foreign currency risk exposure and the management thereof are provided in the financial instruments and risk management (note 46).

Impairment

The group recognises a loss allowance for expected credit losses on trade and other receivables, excluding VAT and prepayments. The amount of expected credit losses is updated at each reporting date.

The group measures the loss allowance for trade and other receivables at an amount equal to lifetime expected credit losses (lifetime ECL), which represents the expected credit losses that will result from all possible default events over the expected life of the receivable.

Credit risk

Details of credit risk are included in the trade and other receivables note (note 12) and the financial instruments and risk management note (note 46).

Derecognition

Refer to the derecognition section of the accounting policy for the policies and processes related to derecognition.

Any gains or losses arising on the derecognition of trade and other receivables is included in profit or loss in the derecognition gains (losses) on financial assets at amortised cost line item.

1.9 Financial instruments (continued)

Investments in equity instruments

Classification

Investments in equity instruments are presented in note 9. They are classified as at fair value through profit or loss. As an exception to this classification, the group may make an irrevocable election, on an instrument by instrument basis, and on initial recognition, to designate certain investments in equity instruments as at fair value through other comprehensive income.

The designation as at fair value through other comprehensive income is never made on investments which are either held for trading or contingent consideration in a business combination.

Recognition and measurement

Investments in equity instruments are recognised when the group becomes a party to the contractual provisions of the instrument. The investments are measured, at initial recognition, at fair value. Transaction costs are added to the initial carrying amount for those investments which have been designated as at fair value through other comprehensive income. All other transaction costs are recognised in profit or loss.

Investments in equity instruments are subsequently measured at fair value with changes in fair value recognised either in profit or loss or in other comprehensive income (and accumulated in equity in the reserve for valuation of investments) depending on their classification. Details of the valuation policies and processes are presented in note 47.

Fair value gains or losses recognised on investments at fair value through profit or loss are included in other operating gains (losses).

Dividends received on equity investments are recognised in profit or loss when the group's right to receive the dividends is established, unless the dividends clearly represent a recovery of part of the cost of the investment. Dividends are included in investment income (note 34).

Investments denominated in foreign currencies

When an investment in an equity instrument is denominated in a foreign currency, the fair value of the investment is determined in the foreign currency. The fair value is then translated to the Rand equivalent using the spot rate at the end of each reporting period. Any resulting foreign exchange gains or losses are recognised in profit or loss as part of the fair value adjustment for investments which are classified as at fair value through profit or loss. Foreign exchange gains or losses arising on investments at fair value through other comprehensive income are recognised in other comprehensive income and accumulated in equity in the reserve for valuation of investments.

Details of foreign currency risk exposure and the management thereof are provided in the financial instruments and risk management (note 46).

Impairment

Investments in equity instruments are not subject to impairment provisions.

Derecognition

Refer to the derecognition section of the accounting policy for the policies and processes related to derecognition.

1.9 Financial instruments (continued)

The gains or losses which are accumulated in equity in the reserve for valuation of investments for equity investments at fair value through other comprehensive income are not reclassified to profit or loss on derecognition. Instead, the cumulative amount is transferred directly to retained earnings.

Investments in debt instruments at fair value through profit or loss

Classification

Certain investments in debt instruments are classified as mandatorily at fair value through profit or loss. These investments do not qualify for classification at amortised cost or at fair value through other comprehensive income because either the contractual terms of these instruments do not give rise, on specified dates to cash flows that are solely payments of principal and interest on the principal outstanding or the objectives of the group business model are met by selling the instruments rather than holding them to collect the contractual cash flows.

The group hold investments in debentures and corporate bonds (note 9) which at fair value through profit or loss.

The group has designated certain investments in debt instruments at fair value through profit or loss. The reason for the designation is to reduce or eliminate an accounting mismatch which would occur if the instruments were not classified as such. Refer to note 9 for details.

Recognition and measurement

Investments in debt instruments at fair value through profit or loss are recognised when the group becomes a party to the contractual provisions of the instrument. The investments are measured, at initial recognition and subsequently, at fair value. Transaction costs are recognised in profit or loss.

Fair value gains or losses are included in other operating gains (losses). Details of the valuation policies and processes are presented in note 47.

Interest received on debt instruments at fair value through profit or loss are included in investment income (note 34).

Investments denominated in foreign currencies

When an investment in a debt instrument at fair value through profit or loss is denominated in a foreign currency, the fair value of the investment is determined in the foreign currency. The fair value is then translated to the Rand equivalent using the spot rate at the end of each reporting period. Any resulting foreign exchange gains or losses are recognised as part of the fair value adjustment in profit or loss.

Details of foreign currency risk exposure and the management thereof are provided in the financial instruments and risk management (note 46).

Impairment

Investments in debt instruments at fair value through profit or loss are not subject to impairment provisions.

Derecognition

Refer to the derecognition section of the accounting policy for the policies and processes related to derecognition.

1.9 Financial instruments (continued)

Non-hedging derivatives

Classification

Non-hedging derivatives are classified as mandatorily at fair value through profit or loss.

The group enters into a variety of derivative financial instruments in order to manage its exposure to foreign exchange risk and cash flow interest rate risk. Derivatives held by the group which are not in designated hedging relationships, include forward exchange contracts and interests rate swaps. (Note 24)

Recognition and measurement

Derivatives are recognised when the group becomes a party to the contractual provisions of the instrument. They are measured, at initial recognition and subsequently, at fair value. Transaction costs are recognised in profit or loss.

Fair value gains or losses are included in other operating gains (losses). Details of the valuation policies and processes are presented in note 47.

Derecognition

Refer to the derecognition section of the accounting policy for the policies and processes related to derecognition.

Borrowings and loans from related parties

Recognition and measurement

Borrowings and loans from related parties are recognised when the group becomes a party to the contractual provisions of the loan. The loans are measured, at initial recognition, at fair value plus transaction costs, if any.

They are subsequently measured at amortised cost using the effective interest method.

The effective interest method is a method of calculating the amortised cost of a financial liability and of allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments (including all fees and points paid or received that form an integral part of the effective interest rate, transaction costs and other premiums or discounts) through the expected life of the financial liability, or (where appropriate) a shorter period, to the amortised cost of a financial liability.

Interest expense, calculated on the effective interest method, is included in profit or loss in finance costs (note 35.)

Borrowings expose the group to liquidity risk and interest rate risk. Refer to note 46 for details of risk exposure and management thereof.

Loans denominated in foreign currencies

When borrowings are denominated in a foreign currency, the carrying amount of the loan is determined in the foreign currency. The carrying amount is then translated to the Rand equivalent using the spot rate at the end of each reporting period. Any resulting foreign exchange gains or losses are recognised in profit or loss in the other operating gains (losses).

Details of foreign currency risk exposure and the management thereof are provided in the specific loan notes and in the financial instruments and risk management (note 46).

1.9 Financial instruments (continued)

Derecognition

Refer to the derecognition section of the accounting policy for the policies and processes related to derecognition.

Trade and other payables

Classification

Trade and other payables (note 20), excluding VAT and amounts received in advance, are classified as financial liabilities subsequently measured at amortised cost.

Recognition and measurement

They are recognised when the group becomes a party to the contractual provisions, and are measured, at initial recognition, at fair value plus transaction costs, if any.

They are subsequently measured at amortised cost using the effective interest method.

The effective interest method is a method of calculating the amortised cost of a financial liability and of allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments (including all fees and points paid or received that form an integral part of the effective interest rate, transaction costs and other premiums or discounts) through the expected life of the financial liability, or (where appropriate) a shorter period, to the amortised cost of a financial liability.

If trade and other payables contain a significant financing component, and the effective interest method results in the recognition of interest expense, then it is included in profit or loss in finance costs (note 35).

Trade and other payables expose the group to liquidity risk and possibly to interest rate risk. Refer to note 46 for details of risk exposure and management thereof.

Trade and other payables denominated in foreign currencies

When trade payables are denominated in a foreign currency, the carrying amount of the payables are determined in the foreign currency. The carrying amount is then translated to the Rand equivalent using the spot rate at the end of each reporting period. Any resulting foreign exchange gains or losses are recognised in profit or loss in the other operating gains (losses).

Details of foreign currency risk exposure and the management thereof are provided in the financial instruments and risk management note (note 46).

Derecognition

Refer to the "derecognition" section of the accounting policy for the policies and processes related to derecognition.

Financial liabilities at fair value through profit or loss

Classification

Financial liabilities which are held for trading are classified as financial liabilities at fair value through profit or loss.

1.9 Financial instruments (continued)

When a financial liability is contingent consideration in a business combination, the group classifies it as a financial liability at fair value through profit or loss.

The group, does, from time to time, designate certain financial liabilities as at fair value through profit or loss. The reason for the designation is to reduce or significantly eliminate an accounting mismatch which would occur if the instruments were not classified as such; or if the instrument forms part of a group of financial instruments which are managed and evaluated on a fair value basis in accordance with a documented management strategy; or in cases where it forms part of a contract containing an embedded derivative and IFRS 9 permits the entire contract to be measured at fair value through profit or loss.

Recognition and measurement

Financial liabilities at fair value through profit or loss are recognised when the group becomes a party to the contractual provisions of the instrument. They are measured, at initial recognition and subsequently, at fair value. Transaction costs are recognised in profit or loss.

Fair value gains or losses recognised on investments at fair value through profit or loss are included in other operating gains (losses).

For financial liabilities designated at fair value through profit or loss, the portion of fair value adjustments which are attributable to changes in the group's own credit risk, are recognised in other comprehensive income and accumulated in equity in the reserve for valuation of liabilities, rather than in profit or loss. However, if this treatment would create or enlarge an accounting mismatch in profit or loss, then that portion is also recognised in profit or loss.

Interest paid on financial liabilities at fair value through profit or loss is included in finance costs (note 35).

Financial liabilities denominated in foreign currencies

When a financial liability at fair value through profit or loss is denominated in a foreign currency, the fair value of the instrument is determined in the foreign currency. The fair value is then translated to the Rand equivalent using the spot rate at the end of each reporting period. Any resulting foreign exchange gains or losses are recognised as part of the fair value adjustment in profit or loss. To the extent that the foreign exchange gain or loss relates to the portion of the fair value adjustment recognised in other comprehensive income, that portion of foreign exchange gain or loss is included in the fair value adjustment recognised in other comprehensive income.

Details of foreign currency risk exposure and the management thereof are provided in the financial instruments and risk management (note 46).

Derecognition

Refer to the derecognition section of the accounting policy for the policies and processes related to derecognition.

The changes in fair value attributable to changes in own credit risk which accumulated in equity for financial liabilities which were designated at fair value through profit or loss are not reclassified to profit or loss. Instead, they are transferred directly to retained earnings on derecognition.

1.9 Financial instruments (continued)

Financial guarantee contracts

A financial guarantee contract is a contract that requires the issuer to make specified payments to reimburse the holder for a loss it incurs because a specified debtor fails to make payments when due in accordance with the terms of a debt instrument.

Financial guarantee contracts issued by the group are initially measured at their fair values and, if not designated as at FVTPL and do not arise from a transfer of a financial asset, are subsequently measured at the higher of:

- the amount of the loss allowance determined in accordance with IFRS 9; and
- the amount initially recognised less, where appropriate, cumulative amount of income recognised in accordance with the revenue recognition policies.

Commitments to provide a loan at a below-market interest rate

Commitments to provide a loan at a below-market interest rate are initially measured at their fair values and, if not designated as at FVTPL, are subsequently measured at the higher of:

- the amount of the loss allowance determined in accordance with IFRS 9; and
- the amount initially recognised less, where appropriate, cumulative amount of income recognised in accordance with the revenue recognition policies.

Cash and cash equivalents

Cash and cash equivalents are stated at carrying amount which is deemed to be fair value.

Bank overdrafts

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

Derecognition

Financial assets

The group derecognises a financial asset only when the contractual rights to the cash flows from the asset expire, or when it transfers the financial asset and substantially all the risks and rewards of ownership of the asset to another party. If the group neither transfers nor retains substantially all the risks and rewards of ownership and continues to control the transferred asset, the group recognises its retained interest in the asset and an associated liability for amounts it may have to pay. If the group retains substantially all the risks and rewards of ownership of a transferred financial asset, the group continues to recognise the financial asset and also recognises a collateralised borrowing for the proceeds received.

Financial liabilities

The group derecognises financial liabilities when, and only when, the group obligations are discharged, cancelled or they expire. The difference between the carrying amount of the financial liability derecognised and the consideration paid and payable, including any non-cash assets transferred or liabilities assumed, is recognised in profit or loss.

1.9 Financial instruments (continued)

Reclassification

Financial assets

The group only reclassifies affected financial assets if there is a change in the business model for managing financial assets. If a reclassification is necessary, it is applied prospectively from the reclassification date. Any previously stated gains, losses or interest are not restated.

The reclassification date is the beginning of the first reporting period following a change in the business model which necessitates a reclassification.

Financial liabilities

Financial liabilities are not reclassified.

1.10 Leases

Company as lessee

A lease liability and corresponding right-of-use asset are recognised at the lease commencement date, for all lease agreements for which the company is a lessee.

The various lease and non-lease components of contracts containing leases are accounted for separately, with consideration being allocated to each lease component on the basis of the relative stand-alone prices of the lease components and the aggregate stand-alone price of the non-lease components (where non-lease components exist).

However as an exception to the preceding paragraph, the company has elected not to separate the non-lease components for leases of land and buildings.

Details of leasing arrangements where the company is a lessee are presented in note 16 Leases (company as lessee).

Lease liability

The lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted by using the rate implicit in the lease. If this rate cannot be readily determined, the company uses its incremental borrowing rate.

Lease payments included in the measurement of the lease liability comprise the following:

- fixed lease payments, including in-substance fixed payments, less any lease incentives;
- variable lease payments that depend on an index or rate, initially measured using the index or rate at the commencement date;
- the amount expected to be payable by the company under residual value guarantees;
- the exercise price of purchase options, if the company is reasonably certain to exercise the option;
- lease payments in an optional renewal period if the company is reasonably certain to exercise an extension option; and
- penalties for early termination of a lease, if the lease term reflects the exercise of an option to terminate the lease.

1.10 Leases (continued)

Variable rents that do not depend on an index or rate are not included in the measurement of the lease liability (or right-of-use asset). The related payments are recognised as an expense in the period incurred and are included in operating expenses (note 16).

The lease liability is presented as a separate line item on the Statement of Financial Position.

The lease liability is subsequently measured by increasing the carrying amount to reflect interest on the lease liability (using the effective interest method) and by reducing the carrying amount to reflect lease payments made. Interest charged on the lease liability is included in interest expense (note 35).

The company remeasures the lease liability (and makes a corresponding adjustment to the related right-of-use asset) when:

- there has been a change to the lease term, in which case the lease liability is remeasured by discounting the revised lease payments using a revised discount rate;
- there has been a change in the assessment of whether the company will exercise a purchase, termination or extension option, in which case the lease liability is remeasured by discounting the revised lease payments using a revised discount rate;
- there has been a change to the lease payments due to a change in an index or a rate, in which case the lease liability is remeasured by discounting the revised lease payments using the initial discount rate (unless the lease payments change is due to a change in a floating interest rate, in which case a revised discount rate is used);
- there has been a change in expected payment under a residual value guarantee, in which case the lease liability is remeasured by discounting the revised lease payments using the initial discount rate;
- a lease contract has been modified and the lease modification is not accounted for as a separate lease, in which case the lease liability is remeasured by discounting the revised payments using a revised discount rate.

When the lease liability is remeasured in this way, a corresponding adjustment is made to the carrying amount of the right-of-use asset, or is recognised in profit or loss if the carrying amount of the right-of-use asset has been reduced to zero.

Right-of-use assets

Lease payments included in the measurement of the lease liability comprise the following:

- the initial amount of the corresponding lease liability;
- any lease payments made at or before the commencement date;
- any initial direct costs incurred;
- any estimated costs to dismantle and remove the underlying asset or to restore the underlying asset or the site on which it is located, when the group incurs an obligation to do so, unless these costs are incurred to produce inventories; and
- less any lease incentives received.

Right-of-use assets are subsequently measured at cost less accumulated depreciation and impairment losses.

Right-of-use assets are depreciated over the shorter period of the lease term and useful life of the underlying asset.

1.10 Leases (continued)

The residual value, useful life and depreciation method of each asset is reviewed at the end of each reporting year. If the expectations differ from previous estimates, the change is accounted for prospectively as a change in accounting estimate. Each part of a right-of-use asset with a cost that is significant in relation to the total cost of the asset is depreciated separately.

The depreciation charge for each year is recognised in profit or loss unless it is included in the carrying amount of another asset.

Company as lessor

Leases for which the company is a lessor are classified as finance or operating leases. Whenever the terms of the lease transfer substantially all the risks and rewards of ownership to the lessee, the contract is classified as a finance lease. All other leases are classified as operating leases.

Lease classification is made at inception and is only reassessed if there is a lease modification.

When the company is an intermediate lessor, it accounts for the head lease and the sublease as two separate contracts. The sublease is classified as a finance or operating lease by reference to the right-of-use asset arising from the head lease. If the head lease is a short-term lease to which the company applies the exemption described previously, then it classifies the sub-lease as an operating lease.

The various lease and non-lease components of contracts containing leases are accounted for separately, with consideration being allocated by applying IFRS 15.

Finance leases

Amounts due from lessees are recognised from commencement date at an amount equal to the company net investment in the lease.

The interest rate implicit in the lease is used to measure the net investment in the lease. If the interest rate implicit in a sublease cannot be readily determined for a sublease, then the discount rate used for the head lease (adjusted for any initial direct costs associated with the sublease) is used to measure the net investment in the sublease.

The interest rate implicit in the lease is defined in a manner which causes the initial direct costs to be included in the initial measurement of the net investment in the lease.

Lease payments included in the measurement of the net investment in the lease comprise the following:

- fixed lease payments, including in-substance fixed payments, less any lease incentives payable;
- variable lease payments that depend on an index or rate, initially measured using the index or rate at the commencement date;
- the amount expected to be receivable by the company from the lessee, a party related to the lessee or a third party unrelated to the company under residual value guarantees (to the extent of third parties, this amount is only included if the party is financially capable of discharging the obligations under the guarantee);
- the exercise price of purchase options, if the lessee is reasonably certain to exercise the option;
- penalties for early termination of a lease, if the lease term reflects the exercise of an option to terminate the lease.

1.10 Leases (continued)

The company recognises finance income over the lease term, based on a pattern that reflects a constant periodic rate of return on the net investment in the lease. Finance income recognised on finance leases is included in investment income in profit or loss (note 34).

The company applies the impairment provisions of IFRS 9 to lease receivables. Refer to the accounting policy for trade and other receivables as lease receivables are impaired on a consistent basis with that accounting policy.

Operating leases - lessor

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

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

Income for leases is disclosed under revenue in profit or loss.

Operating leases - lessee

Short-term and low value lease payments are recognised as an expense on a straight-line basis over the lease term except when another systematic basis is more representative of the time pattern in which economic benefits from the leased asset are consumed. The difference between the amounts recognised as an expense and the contractual payments is recognised as a short-term and low value lease asset. This liability is not discounted.

In the event that lease incentives are received to enter into short-term and low value leases, such incentives are recognised as a liability. The aggregate benefit of incentives is recognised as a reduction of rental expense on a straight-line basis, except where another systematic basis is more representative of the time pattern in which economic benefits from the leased asset are consumed.

Any contingent rents are expensed in the period they are incurred.

1.11 Inventories

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

Net realisable value is the estimated selling price in the ordinary course of business less the estimated costs of completion and the estimated costs necessary to make the sale.

The cost of inventories comprises of all costs of purchase, costs of conversion and other costs incurred in bringing the inventories to their present location and condition.

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

The cost of inventories is assigned using the weighted average cost formula. The same cost formula is used for all inventories having a similar nature and use to the entity.

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

1.12 Non-current assets held for sale

Non-current assets and disposal groups are classified as held for sale if their carrying amount will be recovered through a sale transaction rather than through continuing use. This condition is regarded as met only when the sale is highly probable and the asset (or disposal group) is available for immediate sale in its present condition. Management must be committed to the sale, which should be expected to qualify for recognition as a completed sale within one year from the date of classification.

Non-current assets and disposal groups are classified as held for distribution to owners when the entity is committed to distribute the asset or disposal group to the owners. This condition is regarded as met only when the distribution is highly probable and the asset (or disposal group) is available for immediate distribution in its present condition, provided the distribution is expected to be completed within one year from the classification date.

Non-current assets (or disposal groups) held for sale (distribution to owners) are measured at the lower of their carrying amount and fair value less costs to sell (distribute).

A non-current asset is not depreciated (or amortised) while it is classified as held for sale (held for distribution to owners), or while it is part of a disposal group classified as such.

Interest and other expenses attributable to the liabilities of a disposal group classified as held for sale (distribution to owners) are recognised in profit or loss.

Any gain or loss on the remeasurement on a non-current asset classified as held for sale that does not meet the definition of a discontinued operation is included in profit or loss from continuing operations.

Any impairment loss is recognised for any initial or subsequent write-down of the asset to fair value less cost to sell.

A gain shall be recognised for any subsequent increase in fair value less costs to sell of the asset, but not in excess of the cumulative impairment loss that has been recognised previously.

1.13 Impairment of tangible and intangible non-financial assets

The group assesses at each end of the reporting period whether there is any indication that an asset may be impaired. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any).

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

- tests goodwill acquired in a business combination for impairment annually.

If it is not possible to estimate the recoverable amount of the individual asset, the recoverable amount of the cash-generating unit to which the asset belongs is determined.

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

In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflectscurrent market assessments of the time value of money and the risks specific to the asset for which the estimates of future cash flows have not been adjusted.

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

1.13 Impairment of tangible and intangible non-financial assets (continued)

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

Goodwill acquired in a business combination is, from the acquisition date, allocated to each of the cash-generating units, or groups of cash-generating units, that are expected to benefit from the synergies of the combination.

An impairment loss is recognised for cash-generating units if the recoverable amount of the unit is less than the carrying amount of the units. The impairment loss is allocated to reduce the carrying amount of the assets of the unit in the following order:

- first, to reduce the carrying amount of any goodwill allocated to the cash-generating unit and
- then, to the other assets of the unit, pro rata on the basis of the carrying amount of each asset in the unit.

The carrying amount of an asset included in a cash generating unit may not be reduced below the highest of (1) Its fair value less cost to sell; (2) Its value in use or (3) zero.

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

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

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

1.14 Share capital and equity

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

Ordinary shares are classified as equity and measured at cost.

1.15 Employee benefits

Short-term employee benefits

The cost of short-term employee benefits, (those payable within 12 months after the service is rendered, such as paid vacation leave and sick leave, bonuses, and non-monetary benefits such as medical care), are recognised in the period in which the service is rendered and are not discounted.

The expected cost of compensated absences is recognised as an expense as the employees render services that increase their entitlement or, in the case of non-accumulating absences, when the absence occurs.

The expected cost of profit sharing and bonus payments is recognised as an expense when there is a legal or constructive obligation to make such payments as a result of past performance.

1.15 Employee benefits (continued)

Defined contribution plans

The companies operate a provident fund on behalf of its employees. The schemes are generally funded through payments to insurance companies or trustee-administered funds, determined by periodic actuarial calculations. A defined contribution plan is a plan under which the company pays fixed contributions into a separate entity. The company has no legal or constructive obligations to pay further contributions if the fund does not hold sufficient assets to pay all employees the benefit relating to employee service in the current and prior periods.

Payments to defined contribution retirement benefit plans are charged as an expense as they fall due. Prepaid contributions are recognised as an asset to the extent that a cash refund or a reduction in the future payments is available.

Defined benefit plans

Some Group companies provide post-retirement healthcare benefits to their retirees. The entitlement to these benefits is usually conditional on the employee remaining in service up to retirement age and the completion of a minimum service period. For defined benefit plans the cost of providing the benefits is determined using the projected unit credit method.

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

Consideration is given to any event that could impact the funds up to the end of the reporting period where the interim valuation is performed at an earlier date.

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

Actuarial gains and losses are recognised in the year in which they arise, in other comprehensive income.

Gains or losses on the curtailment or settlement of a defined benefit plan is recognised when the group is demonstrably committed to curtailment or settlement.

When it is virtually certain that another party will reimburse some or all of the expenditure required to settle a defined benefit obligation, the right to reimbursement is recognised as a separate asset. The asset is measured at fair value. In all other respects, the asset is treated in the same way as plan assets. In profit or loss, the expense relating to a defined benefit plan is presented as the net of the amount recognised for a reimbursement.

The amount recognised in the statement of financial position represents the present value of the defined benefit obligation as adjusted for unrecognised actuarial gains and losses and unrecognised past service costs, and reduces by the fair value of plan assets.

Any asset is limited to unrecognised actuarial losses and past service costs, plus the present value of available refunds and reduction in future contributions to the plan.

1.16 Provisions and contingencies

Provisions are recognised when:

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

The amount recognised as a provision is the best estimate of the consideration required to settle the present obligation at the end of the reporting period, taking into account the risks and uncertainties surrounding the obligation. When a provision is measured using the cash flows estimated to settle the present obligation, its carrying amount is the present value of those cash flows (where the effect of the time value of money is material).

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

Provisions are not recognised for future operating losses.

Onerous contracts

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

An onerous contract is considered to exist where the Group has a contract under which the unavoidable costs of meeting the obligations under the contract exceed the economic benefits expected to be received from the contract. Rental income relating to Pelchem has resulted in an onerous contract.

Contingent assets and liabilities

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

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

Contingent assets and contingent liabilities are not recognised. Contingencies are disclosed in note 42.

1.17 Government grants and deferred grant income

Government grants are recognised when there is reasonable assurance that:

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

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

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

1.17 Government grants and deferred grant income (continued)

Government grants related to assets, including non-monetary grants at fair value, are presented in the statement of financial position by setting up the grant as deferred income or by deducting the grant in arriving at the carrying amount of the asset.

Grants related to income are presented as a credit in the profit or loss (separately).

Repayment of a grant related to income is applied first against any un-amortised deferred credit set up in respect of the grant. To the extent that the repayment exceeds any such deferred credit, or where no deferred credit exists, the repayment is recognised immediately as an expense.

Repayment of a grant related to an asset is recorded by increasing the carrying amount of the asset or reducing the deferred income balance by the amount repayable. The cumulative additional depreciation that would have been recognised to date as an expense in the absence of the grant is recognised immediately as an expense.

1.18 Revenue

NECSA derives revenue from the following major sources:

- Sale of goods to customer
- Services rendered to customers
- Interest
- Dividend

Revenue is measured based on the consideration specified in a contract with a customer and excludes amounts collected on behalf of third parties. The company recognises revenue when it transfers control of a product or service to a customer.

Sale of Goods to customers

The Group sells goods directly to customers. Revenue is recognised at a point in time for sales of goods. For sales of goods to customers, revenue is recognised when control of the goods has transferred, being at the point the customer purchases the goods. Payment of the transaction price is due immediately at the point the customer purchases the goods. A receivable is recognised for account holding customers. Delivery occurs when the goods have been shipped to the customer's specific location. When the customer initially purchases the goods the transaction price received by the company is recognised as a contract liability until the goods have been delivered to the customer.

Services Rendered

The Group renders services for its customers. Revenue from providing services is recognised in the accounting period in which the services are rendered. For fixed-price contracts, revenue is recognised based on the actual service provided to the end of the reporting period as a proportion of the total services to be provided. Estimates of revenues, costs or extent of progress toward completion are revised if circumstances change. Any resulting increases or decreases in estimated revenues or costs are reflected in profit or loss in the period in which the circumstances that give rise to the revision become known by management. In case of fixed-price contracts, the customer pays the fixed amount based on a payment schedule. If the services rendered by the company exceed the payment, a contract asset is recognised. If the payments exceed the services rendered, a contract liability is recognised.

1.18 Revenue (continued)

Contract Revenue

Contract revenue comprises:

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

Interest Income

Interest income from a financial asset is recognised when it is probable that the economic benefits will flow to the Group and the amount of income can be measured reliably. Interest income is accrued on a time basis, by reference to the principal outstanding and at the effective interest rate applicable, which is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset to that asset's net carrying amount on initial recognition.

Dividends

Dividends are recognised, in profit or loss, when the shareholder's right to receive payment has been established provided that it is probable that the economic benefits will flow to the entity and that the amount of dividend income can be measured reliably. Service fees included in the price of a product are recognised as revenue over the period during which the service is performed.

1.19 Translation of foreign currencies

Functional and presentation currency

Items included in the annual financial statements of each of the group entities are measured using the currency of the primary economic environment in which the entity operates (functional currency).

The consolidated annual financial statements are presented in Rand which is the group functional and presentation currency.

Foreign currency transactions

In preparing the financial statements of each individual Group entity, transactions in currencies other than the entity's functional currency (foreign currencies) are recognised at the rates of exchange prevailing at the dates of the transactions. At the end of each reporting period, monetary items denominated in foreign currencies are retranslated at the rates prevailing at that date. Non-monetary items carried at fair value that are denominated in foreign currencies are retranslated at the rates prevailing at the date when the fair value was determined. Non-monetary items that are measured in terms of historical cost in a foreign currency are not retranslated.

Exchange differences on monetary items are recognised in profit or loss in the period in which they arise except for:

- exchange differences on transactions entered into in order to hedge certain foreign currency risks; and
- exchange differences on foreign currency borrowings relating to assets under construction for future productive use, which are included in the cost of those assets when they are regarded as an adjustment to interest costs on those foreign currency borrowings;

1.19 Translation of foreign currencies (continued)

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

When a gain or loss on a non-monetary item is recognised to other comprehensive income and accumulated in equity, any exchange component of that gain or loss is recognised to other comprehensive income and accumulated in equity. When a gain or loss on a non-monetary item is recognised in profit or loss, any exchange component of that gain or loss is recognised in profit or loss.

Necsa is exposed to foreign currency translation risks relating to Euro, Malaysian Ringgit and Dirham currencies.

Necsa, NTP and Pelchem enter into FEC's for all procurement transactions over R300 000 and they enter into FEC contracts for exposure to income receivable.

Investments in subsidiaries, joint ventures and associates

For the purposes of presenting consolidated financial statements, the assets and liabilities of the Group's foreign operations are translated into Rands using exchange rates prevailing at the end of each reporting period. Income and expense items are translated at the average exchange rates for the period, unless exchange rates fluctuate significantly during that period, in which case the exchange rates at the dates of the transactions are used. Exchange differences arising, if any, are recognised in other comprehensive income and accumulated in equity (attributed to non-controlling interests as appropriate).

On the disposal of a foreign operation (i.e. a disposal of the Group's entire interest in a foreign operation, or a disposal involving loss of control over a subsidiary that includes a foreign operation, a disposal involving loss of joint control over a jointly controlled entity that includes a foreign operation, or a disposal involving loss of significant influence over an associate that includes a foreign operation), all of the exchange differences accumulated in equity in respect of that operation attributable to the owners of the Company are reclassified to profit or loss.

In the case of a partial disposal that does not result in the Group losing control over a subsidiary that includes a foreign operation, the proportionate share of accumulated exchange differences are re-attributed to non-controlling interests and are not recognised in profit or loss. For all other partial disposals (i.e. reductions in the Group's ownership interest in associates or jointly controlled entities that do not result in the Group losing significant influence or joint control), the proportionate share of the accumulated exchange differences is reclassified to profit or loss.

Goodwill and fair value adjustments on identifiable assets and liabilities acquired arising on the acquisition of a foreign operation are treated as assets and liabilities of the foreign operation and translated at the rate of exchange prevailing at the end of each reporting period. Exchange differences arising are recognised in equity.

1.20 Related Parties

The Group operates in an economic environment currently dominated by entities directly or indirectly owned by the South African Government. As a result of the constitutional independence of all three spheres of government in South Africa, only parties within the national sphere of government are considered to be related parties.

1.20 Related Parties (continued)

Key management is defined as being individuals with the authority and responsibility for planning, directing and controlling the activities of the entity. All individuals from the level of Chief Executive Officer up to the Board of Directors are regarded as key management.

Close family members of key management personnel are considered to be those family members who may be expected to influence or be influenced by key management individuals or other parties related to the entity.

1.21 Fruitless and wasteful, irregular and unauthorised expenditure

Fruitless and wasteful expenditure in terms of the Public Finance Management Act means expenditure which was made in vain and would have been avoided had reasonable care been exercised are recorded in the notes to the financial statements.

Irregular expenditure is recorded in the notes to the financial statements. The amount recorded in the notes are equal to the value of the irregular expenditure incurred unless it is impracticable to determine the value thereof.

Unauthorised expenditure, when confirmed, must be recorded in the Statement of Financial Position. The amount recorded must be equal to the overspending within the division or the expenditure incurred that was not in accordance with the purpose of the division.

1.22 Borrowing costs

Borrowing costs that are directly attributable to the acquisition, construction or production of a qualifying asset are capitalised as part of the cost of that asset until such time as the asset is ready for its intended use. The amount of borrowing costs eligible for capitalisation is determined as follows:

- Actual borrowing costs on funds specifically borrowed for the purpose of obtaining a qualifying asset less any temporary investment of those borrowings.
- Weighted average of the borrowing costs applicable to the entity on funds generally borrowed for the purpose of obtaining a qualifying asset. The borrowing costs capitalised do not exceed the total borrowing costs incurred.

The capitalisation of borrowing costs commences when:

- expenditures for the asset have occurred;
- borrowing costs have been incurred, and
- activities that are necessary to prepare the asset for its intended use or sale are in progress.

Capitalisation is suspended during extended periods in which active development is interrupted.

Capitalisation ceases when substantially all the activities necessary to prepare the qualifying asset for its intended use or sale are complete.

All other borrowing costs are recognised as an expense in the period in which they are incurred.

Notes to the Annual Financial Statements

2. SIGNIFICANT JUDGEMENTS AND SOURCES OF ESTIMATION UNCERTAINTY

Significant judgement and estimates in assessing the impairment of Financial assets

Financial assets, other than those at FVPL, are assessed for indicators of impairment at the end of each reporting period. The Group uses significant judgement in determining whether financial assets are considered to be impaired when there is objective evidence that, as a result of one or more events that occurred after the initial recognition of the financial asset, the estimated future cash flows of the investment have been affected.

For Annual Financial Statements equity investments, a significant or prolonged decline in the fair value of the security below its cost is considered to be objective evidence of impairment. This determination requires significant judgement by Group.

For certain categories of financial assets, such as trade receivables, assets are assessed for impairment on a collective basis even if they were assessed not to be impaired individually. Objective evidence of impairment for a portfolio of receivables could include the Group's past experience of collecting payments, an increase in the number of delayed payments in the portfolio past the average credit period of 90 days, as well as observable changes in national or local economic conditions that correlate with default on receivables.

Classification of Buildings Rented out

The buildings are all located on the Necsa premises and due to the security requirements related to the nuclear activities of Necsa, these buildings cannot be sold separately and has to be kept by Necsa as part of fulfilling its nuclear responsibilities. The purpose with which the buildings are held is therefore solely connected to Necsa's main nuclear business and the buildings are not held for the purpose of capital appreciation, nor is it held to earn rentals. When buildings are vacant and when there is a tenant to which a vacant building can be leased, vacant buildings are leased out. The leasing activity is incidental to the purpose for which the buildings are held and the buildings are not held for the purpose of leasing them out.

Allowance for slow moving, damaged and obsolete inventory

An allowance is made to write inventory down to the lower of cost or net realisable value. Management have made estimates of the selling price and direct cost to sell on certain inventory items. The write down is included in the operating profit note 33.

Fair value estimation

Some of the Group assets and liabilities are measured at fair value for financial reporting purposes. The Chief Financial Officer's determines appropriate valuation techniques based on the accounting standards.

The fair value of financial instruments traded in active markets (such as trading and available-for-sale securities) is based on quoted market prices at the end of the reporting period. The quoted market price used for financial assets held by the Group is the current bid price.The fair value of financial instruments that are not traded in an active market is determined by using valuation techniques. The Group uses a variety of methods and makes assumptions that are based on market conditions existing at the end of each reporting period. Other techniques, such as estimated discounted cash flows, are used to determine fair value for the remaining financial instruments. The fair value of forward foreign exchange contracts is determined using quoted forward exchange rates at the end of the reporting period. In estimating the fair value of an asset or liability, the Group uses market observable data to the extent that it is available. Where level 1 inputs are not available, the Group engages valuers to establish the appropriate valuation techniques and inputs into the model.

2. Significant judgements and sources of estimation uncertainty (continued)

The carrying value less impairment provision of trade receivables and payables are assumed to approximate their fair values. The fair value of financial liabilities for disclosure purposes is estimated by discounting the future contractual cash flows at the current market interest rate that is available to the Group for similar financial instruments. The assumption is based on the management expectation that outstanding balances will be collected or paid within twelve months, therefore the time value of money will not have an impact as it is considered to be immaterial.

Information about valuation techniques, inputs used in determining fair values of various assets and liabilities are disclosed in notes.

Impairment testing of Goodwill and tangible assets

The recoverable amounts of cash-generating units and individual assets have been determined based on the higher of value-in-use calculations and fair values less costs to sell. These calculations require the use of estimates and assumptions. It is reasonably possible that an assumption may change which may then impact estimations and may then require a material adjustment to the carrying value of goodwill and tangible assets.

The Group reviews and tests the carrying value of assets when events or changes in circumstances suggest that the carrying amount may not be recoverable. In addition, goodwill is tested on an annual basis for impairment. Assets are grouped at the lowest level for which identifiable cash flows are largely independent of cash flows of other assets and liabilities. If there are indications that impairment may have occurred, estimates are prepared of expected future cash flows for each group of assets. Expected future cash flows used to determine the value in use of goodwill and tangible assets are inherently uncertain and could materially change over time.

Provisions

Provisions are estimated by management based on the available information. Additional disclosure of these estimates are included in note 19 Provisions.

Taxation

Necsa is not a tax paying entity however subsidiaries are income tax paying entities

Judgement is required in determining the provision for income taxes due to the complexity of legislation. There are many transactions and calculations for which the ultimate tax determination is uncertain during the ordinary course of business. The Group recognises liabilities for anticipated tax audit issues based on estimates of whether additional taxes will be due. Where the final tax outcome of these matters is different from the amounts that were initially recorded, such differences will impact the income tax and deferred tax provisions in the period in which such determination is made.

The Group recognises the net future tax benefit related to deferred income tax assets to the extent that it is probable that the deductible temporary differences will reverse in the foreseeable future. Assessing the recoverability of deferred income tax assets requires the Group to make significant estimates related to expectations of future taxable income. Estimates of future taxable income are based on forecast cash flows from operations and the application of existing tax laws in each jurisdiction. To the extent that future cash flows and taxable income differ significantly from estimates, the ability of the Group to realise the net deferred tax assets recorded at the end of the reporting period could be impacted.

Useful lives and residual values of property, plant and equipment

The useful lives of assets are based on management's estimation. Management considers the following factors to determine the optimum useful life expectation for each of the individual items of property, plant and equipment.

2. Significant judgements and sources of estimation uncertainty (continued)

- Expected usage of the asset. Usage is assessed by reference to the assets expected capacity or physical output.
- Expected physical wear and tear, which depends on operational factors such as the number of shifts for which the asset is to be used and the repair and maintenance programme, and the care and maintenance of the asset while idle.
- Technical or commercial obsolescence arising from changes or improvement in production or from a change in the market demand for the product or service output of the asset.
- Exit policy of the Company.

The estimation of residual value of assets is also based on management's judgement that the assets will be sold and what its condition will be at the end of its useful life. For assets that incorporate both a tangible and intangible portion, management uses judgement to assess which element is more significant to determine whether it should be treated as property, plant and equipment or intangible assets.

Post retirement benefit obligation

Judgement is required when recognizing and measuring the retirement benefit obligation of the Group and the Company. The obligation is valued by an independent actuary at each reporting date. The actuarial valuation method is used to value the obligation and the projected unit credit method is used. Future benefit values are projected using specific actuarial assumptions and the liability to in-service members is accrued over the expected working lifetime. The most significant of which are subsidy inflation, longevity, cash flow risk, changes in bond yields and CPI as well as further changes in legislation.

Lease classification

Lessors

The company is party to leasing arrangements, as a lessor. The treatment of leasing transactions in the annual financial statements is mainly determined by whether the lease is considered to be an operating lease or a finance lease. In making this assessment, management considers the substance of the lease, as well as the legal form, and makes a judgement about whether substantially all of the risks and rewards of ownership are transferred.

Significant judgement was applied by management in concluding the correct lease classification. Management therefore determines whether or not the lease should be classified as an operating or finance lease.

Lessees

IFRS 16 estimation and uncertainty:

- calculating discount rate
- estimating lease term
- estimating variable lease payments dependent on index or rate

Other IFRS 16 judgements:

- judgement in identifying whether a contract includes a lease
- establishing whether or not it is reasonably certain that an extension option will be exercised
- considering whether or not it is reasonably certain that a termination option will not be exercised
- determining whether or not variable lease payments are truly variable or insubstance fixed

2. Significant judgements and sources of estimation uncertainty (continued)

Critical judgements in determining the lease term

In determining the lease term, management considers all facts and circumstances that create an economic incentive to exercise an extension option: or not exercise a termination option. Extension options (or periods after termination options) are only included in the lease term if the lease is reasonably certain to be extended(or not terminated)

The assessment is reviewed if a significant event or a significant change in circumstances occurs which affects this assessment and that is within the control of the lessee. During the current financial year, the financial effect of revising lease terms to reflect the effect of exercising extension and termination options was an increase in recognised lease liabilities and right-of-use assets of R94million

Impact of COVID-19

COVID-19 was declared a global pandemic in March 2020. The note below describes the impact on the Group's local and international operations.

During March 2020, the first case of COVID-19 was reported in South Africa. In response, the South African government enforced a 21-day lockdown beginning Friday, 27 March 2020 and later extended it for a further 14 days ended Thursday, 30 April 2020.

Locally, certain restrictions on economic activities and movement were lifted from 1 May 2020. Similar announcements easing restrictions in other countries were made as the governments of those countries introduced measures to revive their economies. The relaxation of restrictions has enabled the Group to ramp up existing operations provided that strict health and safety guidelines mandated by the government is adhered to.

The Group's prior financial year concluded on 31 March 2020, three weeks after the World Health Organization recognised COVID-19 as a global pandemic and a few days after lockdown restrictions were implemented in South Africa. The impact of COVID-19 has, however, not been recognised as an adjusting subsequent event in preparing these financial statements as it did not impact materially on the Group's performance. While every effort has been made to quantify the future impact that the virus will have on the business, there is a lot of uncertainty on how the pandemic will eventually fold out.

Business interruption

The Group supplies critical products and services to the medical industry. The Group's products are key inputs for medical and similar service providers. As such, the products are classified as essential services. The COVID-19 impact on the Group's business operations was minimal at financial year end.

The Group's management of the COVID-19 crisis

As the business operates mainly in South Africa, the response to the COVID-19 crisis has been guided by the national authorities and international guidelines issued by the World Health Organization. The Group is working under strict conditions, across all its operations, to limit and minimise the potential for COVID-19 transmission, and will continue to support and educate employees on the appropriate hygiene standards to follow. The Group continues to prioritise the health and safety of all employees and, where possible, has arranged for many employees to work remotely.

The extent of the effect of COVID-19 on business operations is continually being reassessed, with business continuity plans being prepared and executed to deal with anticipated outcomes. Additionally, the Group's internal policies and risk management practices are continuously being updated to ensure that they remain aligned to the rapidly evolving situation.

2. Significant judgements and sources of estimation uncertainty (continued)

Impact on the annual financial statements

The Group has assessed the impact of COVID-19 on the Annual Financial Statements.

Necsa's business model leverages Necsa's knowledge base, legacy infrastructure investment, and on-going research and development in the fulfilment of the State's nuclear obligations as well as the pursuit of commercial ventures in addition to its other business model objectives. However, due to the limited impact of the COVID-19 pandemic at the Group's financial year end, the results of the Group did not include any adjusting events.

Impairment of financial assets

The Group assesses impairment of financial assets by calculating the expected credit loss allowance on trade and other receivables. Forward-looking information included the market impact of COVID-19 by adjusting the credit risk of receivables for macro -economic conditions that impact credit risk. As the Group operates in a niche market with a reliable customer base, the impact was not significant to warrant any significant adjustments to financial assets.

Inventory obsolescence

The Group's inventory is continuously considered for obsolescence due to the nature of the group's business. The amount of any writedown of inventories to net realisable value and losses of inventories are recognised as an expense in the period the write-down or loss occurs. Hence, the COVID-19's impact on inventory valuations was minimal.

Cash flows and liquidity

The Group assessed the impact of the lockdown on the cash resources on hand and available from committed facilities together with the possibility of default by customers. The Group is prioritising its spending with a focus on reducing non-essential costs and making operations more efficient. The Group is further committed to minimising the impact on salaries and job losses.

The Group's liquidity and access to facilities is continuously monitored to ensure that sufficient funds are available to meet the group's commitments. The Group has overdraft facilities with local banks and other funding institutions. In addition, the company can rely on financial support from its shareholder should the need arise.

3. NEW STANDARDS AND INTERPRETATIONS

3.1 Standards and interpretations effective and adopted in the current year

In the current year, the group has adopted the following standards and interpretations that are effective for the current financial year and that are relevant to its operations:

Standard/ Interpretation:	Effective date: Years beginning on or after	Expected impact:
Interest Rate Benchmark Reform - Phase 2: Amendments to IFRS 4	01 January 2021	No material impact
Interest Rate Benchmark Reform - Phase 2: Amendments to IFRS 7	01 January 2021	No material impact
Interest Rate Benchmark Reform - Phase 2: Amendments to IFRS 9	01 January 2021	No material impact
Interest Rate Benchmark Reform - Phase 2: Amendments to IAS 39	01 January 2021	No material impact
COVID-19 - Related Rent Concessions - Amendment to IFRS 16	01 June 2020	No material impact

3.2 Standards and interpretations not yet effective

The group has chosen not to early adopt the following standards and interpretations, which have been published and are mandatory for the group's accounting periods beginning on or after 01 April 2022 or later periods:

Standard/ Interpretation:	Effective date: Years beginning on or after and date of planned adoption	Expected impact:
○ IFRS 4 Insurance Contracts: Extension of the Temporary Exemption from Applying IFRS 9	01 January 2023	No material impact expected.
○ Practice Statement 2 Making Materiality Judgements: Disclosure of Accounting Policies	01 January 2023	Possible changes to the wording of accounting policies to align to the new description. The content of what is described in the accounting policies may also change.
○ IFRS 7 Financial Instruments: Disclosure of Accounting Policies	01 January 2023	Possible changes to the wording of accounting policies to align to the new description. The content of what is described in the accounting policies may also change.
○ IAS 26 Accounting and Reporting by Retirement Benefit Plans: Disclosure of Accounting Policies	01 January 2023	Possible changes to the wording of accounting policies to align to the new description. The content of what is described in the accounting policies may also change.
○ IAS 34 Interim Financial Reporting: Disclosure of Accounting Policies	01 January 2023	No material impact expected.
○ IFRS 8 Operating Segments: Disclosure of Accounting Policies	01 January 2023	No material impact expected.
○ IAS 12 Income Taxes: Deferred Tax related to Assets and Liabilities arising from a Single Transaction	01 January 2023	No material impact expected.
○ IFRS 17 Insurance Contracts: IFRS Taxonomy 2020 Extension of the Temporary Exemption from Applying IFRS 9 and Property, Plant and Equipment - Proceeds before Intended Use Amendment to IFRS 17 in respect of initial application of IFRS 17 and IFRS 9 - Comparative information	01 January 2023	No material impact expected.
○ IFRS 9 Financial Instruments: IFRS Taxonomy 2020 Extension of the Temporary Exemption from Applying IFRS 9 and Property, Plant and Equipment - Proceeds before Intended Use	01 January 2023	No material impact expected.
○ IAS 16 Property, Plant and Equipment: IFRS Taxonomy 2020 Extension of the Temporary Exemption from Applying IFRS 9 and Property, Plant and Equipment - Proceeds before Intended Use	01 January 2023	No material impact expected.
○ IFRS 1 First-time Adoption of International Financial Reporting Standards: Deferred Tax related to Assets and Liabilities arising from a Single Transaction	01 January 2023	No material impact expected.
○ Definition of accounting estimates: Amendments to IAS 8	01 January 2023	Possible changes to the wording of accounting policies and notes to align to the new definition.

3.2 Standards and interpretations not yet effective

Standard/ Interpretation:	Effective date: Years beginning on or after and date of planned adoption	Expected impact:
○ Classification of Liabilities as Current or Non-Current - Amendment to IAS 1	01 January 2023	No material impact expected.
○ IFRS 17 Insurance Contracts	01 January 2023	No material impact expected.
○ Annual Improvement to IFRS Standards 2018-2020: Amendments to IFRS 1	01 January 2022	No material impact expected.
○ Reference to the Conceptual Framework: Amendments to IFRS 3	01 January 2022	No material impact expected.
○ Annual Improvement to IFRS Standards 2018-2020: Amendments to IFRS 9	01 January 2022	No material impact expected.
○ Property, Plant and Equipment: Proceeds before Intended Use: Amendments to IAS 16	01 January 2022	No material impact expected.
○ Onerous Contracts - Cost of Fulfilling a Contract: Amendments to IAS 37	01 January 2022	No material impact expected.
○ Annual Improvement to IFRS Standards 2018-2020: Amendments to IAS 41	01 January 2022	No material impact expected.

4. PROPERTY, PLANT AND EQUIPMENT

Group	2022			2021		
	Cost or revaluation	Accumulated depreciation	Carrying value	Cost or revaluation	Accumulated depreciation	Carrying value
Used within the group						
Research facilities	40,979	(9,896)	31,083	40,979	(9,315)	31,664
Component spares	907	(614)	293	907	(540)	367
Furniture and fixtures	22,466	(18,570)	3,896	22,597	(18,207)	4,390
IT equipment	133,375	(114,583)	18,792	127,474	(107,910)	19,564
Land and buildings	936,361	(45,534)	890,827	946,867	(43,896)	902,971
Leasehold improvements	17,503	(1,759)	15,744	3,647	(1,356)	2,291
Machinery and equipment	462,284	(363,044)	99,240	470,833	(352,557)	118,276
Motor vehicles and transport containers	67,112	(54,061)	13,051	66,917	(51,726)	15,191
Office equipment	14,520	(12,806)	1,714	14,661	(13,047)	1,614
Plant	642,390	(325,038)	317,352	628,689	(324,806)	303,883
Leased out under operating leases						
Buildings	14,632	-	14,632	14,632	-	14,632
Total	**2,352,529**	**(945,905)**	**1,406,624**	**2,338,203**	**(923,360)**	**1,414,843**

4. Property, plant and equipment (continued)

Company	2022			2021		
	Cost or revaluation	Accumulated depreciation	Carrying value	Cost or revaluation	Accumulated depreciation	Carrying value
Used within the company						
Furniture and fixtures	15,277	(13,644)	1,633	15,275	(13,318)	1,957
IT equipment	76,617	(64,672)	11,945	71,958	(60,374)	11,584
Land and buildings	907,998	(45,339)	862,659	918,804	(43,701)	875,103
Machinery and equipment	333,803	(270,152)	63,651	355,088	(268,340)	86,748
Motor vehicles and transport containers	30,786	(24,100)	6,686	30,720	(22,381)	8,339
Office equipment	12,899	(11,366)	1,533	12,586	(11,222)	1,364
Plant	239,442	(124,688)	114,754	209,570	(123,271)	86,299
Research facilities	40,979	(9,896)	31,083	40,979	(9,315)	31,664
Total	**1,657,801**	**(563,857)**	**1,093,944**	**1,654,980**	**(551,922)**	**1,103,058**

4. Property, plant and equipment (continued)

Reconciliation of property, plant and equipment - Group - 2022								
	Opening balance	Additions	Disposals	Revaluations	Other changes, movements	Depreciation	Impairment (loss)/ reversal	Total
Used within the group								
Land and buildings	902,971	4,899	-	30,945	2	(45,323)	(2,667)	890,827
Plant	303,883	36,497	114	-	(14,152)	(8,988)	(2)	317,352
Furniture and fixtures	4,390	110	-	-	295	(900)	1	3,896
Motor vehicles	15,191	1,268	(625)	-	-	(2,783)	-	13,051
Office equipment	1,614	315	(42)	-	-	(183)	10	1,714
IT equipment	19,564	6,687	(5)	-	43	(7,059)	(438)	18,792
Research facilities	31,664	2	-	-	-	(581)	(2)	31,083
Leasehold improvements	2,291	-	-	-	13,856	(403)	-	15,744
Machinery and equipment	118,276	15,797	(8,323)	-	(34)	(22,698)	(3,778)	99,240
Component spares	367	1,605	-	-	-	(994)	(685)	293
Buildings	14,632	-	-	-	-	-	-	14,632
	1,414,843	**67,180**	**(8,881)**	**30,945**	**10**	**(89,912)**	**(7,561)**	**1,406,624**

4. Property, plant and equipment (continued)

Reconciliation of property, plant and equipment - Group - 2021								
	Opening balance	Additions	Disposals	Revaluations	Other changes, movements	Depreciation	Impairment (loss)/ reversal	Total
Used within the group								
Land and buildings	832,947	221	-	109,188	197	(39,582)	-	902,971
Plant	308,720	3,458	(3)	-	-	(8,292)	-	303,883
Furniture and fixtures	4,774	515	(26)	-	-	(858)	(15)	4,390
Motor vehicles	11,074	7,163	(419)	-	-	(2,627)	-	15,191
Office equipment	1,910	98	(6)	-	-	(388)	-	1,614
IT equipment	19,671	6,843	(42)	-	-	(6,878)	(30)	19,564
Research facilities	31,785	495	-	-	-	(616)	-	31,664
Leasehold improvements	2,670	-	-	-	-	(379)	-	2,291
Machinery and equipment	129,305	19,780	(41)	-	-	(29,172)	(1,596)	118,276
Component spares	447	-	-	-	(850)	(45)	815	367
Leased out under operating leases								
Buildings	14,632	-	-	-	-	-	-	14,632
	1,357,935	**38,573**	**(537)**	**109,188**	**(653)**	**(88,837)**	**(826)**	**1,414,843**

4. Property, plant and equipment (continued)

Reconciliation of property, plant and equipment - Company - 2022							
	Opening balance	Additions	Disposals	Revaluations	Other changes, movements	Depreciation	Total
Used within the group							
Land and buildings	875,103	2,233	-	30,645	1	(45,323)	862,659
Plant	86,299	29,871	-	-	-	(1,416)	114,754
Furniture and fixtures	1,957	7	-	-	-	(331)	1,633
Motor vehicles	8,339	66	-	-	-	(1,719)	6,686
Office equipment	1,364	316	-	-	-	(147)	1,533
IT equipment	11,584	4,711	(5)	-	44	(4,389)	11,945
Research facilities	31,664	-	-	-	-	(581)	31,083
Machinery and equipment	86,748	1,895	(8,229)	-	(35)	(16,728)	63,651
Leased out under operating leases							
	1,103,058	**39,099**	**(8,234)**	**30,645**	**10**	**(70,634)**	**1,093,944**

Reconciliation of property, plant and equipment - Company - 2021							
	Opening balance	Additions	Disposals	Revaluations	Other changes, movements	Depreciation	Total
Used within the group							
Buildings	805,178	222	-	109,088	197	(39,582)	875,103
Plant and machinery	85,932	2,006	-	-	-	(1,639)	86,299
Furniture and fixtures	2,143	175	-	-	-	(361)	1,957
Motor vehicles	4,773	5,141	-	-	-	(1,575)	8,339
Office equipment	1,611	45	-	-	-	(292)	1,364
IT equipment	11,845	4,238	(26)	-	-	(4,473)	11,584
Research facilities	31,785	494	-	-	-	(615)	31,664
Machinery and equipment	102,794	6,252	-	-	-	(22,298)	86,748
Leased out under operating leases							
	1,046,061	**18,573**	**(26)**	**109,088**	**197**	**(70,835)**	**1,103,058**

4. Property, plant and equipment (continued)

Property, plant and equipment encumbered as security

No assets have been pledged as security and are secured by the lessor's title to the leased assets.

Details of properties

Land and buildings consist of the following properties:

Necsa: Farm 567, Weldaba; Erf 1150, 1153, 1155 and 1156 . The properties were revalued as at 31 March 2019, 31 March 2020, 31 March 2021 and 31 March 2022 by an independent valuator. Please refer revaluation below.

Albertinia; Erf 4473 and 4474 Riverdale; Erf 1115, 1224, 1916, 1917, 1919, 1921, 1922, 1924, 1926, 1928 and 1929. These assets are measured at directors valuation.

Springbok; Farm 369 and 380 Vaalputs. The rest of the assets are measured at directors valuation.

Gammatec NDT: Portion 91 of Farm 601 Klipplaatdrif, Vereeniging. The property is encumbered as disclosed in note of Gammatec NDT Annual Financial Statements. The property was revalued as at 25 March 2019 by an independent valuer.

AEC Amersham: Erf 176, 100 Indianapolis Street, Kyalami. The property was revalued as at 31 March 2021 by an independent valuer.

The estimation of the useful lives of property, plant and equipment is based on historic performance as well as expectations about future use and therefore requires a significant degree of judgement to be applied by management. These depreciation rates represent management's current best estimate of the useful lives of the assets.

Transfer of property, plant and equipment also include transfers to other asset classes.

The revaluation reserve may not be distributed to shareholders.

A register containing the information required by Regulation 25(3) of the Companies Regulations, 2011 is available for inspection at the registered office of the Company.

Capitalised expenditure

Expenditure recognised in the carrying amount of property, plant and equipment items in the course of its construction:

Group	2022	2021
Used within the group		
Furniture and fixtures	7	15
IT equipment	(683)	162
Land and buildings	10,002	7,770
Machinery and equipment	9,705	9,794
Motor vehicles and transport containers	66	454
Office equipment	309	28
Plant	185,774	156,398
Research facilities	8,744	8,744
	213,924	**183,365**

4. Property, plant and equipment (continued)

Company	2022	2021
Furniture and fixtures	7	15
IT equipment	(683)	162
Land and buildings	10,002	7,770
Machinery and equipment	9,705	9,794
Motor vehicles and transport containers	66	454
Office equipment	309	28
Plant	185,774	156,398
Research facilities	8,744	8,744
	213,924	**183,365**

Revaluations

During 2019, 2020 and 2021 Land and Buildings were valued by an independent valuer. The carrying amount that would have been recognised, had the asset been carried under the cost model would have been as follows:

Land and Buildings	41,190	41,190	19,054	19,054

5. INTANGIBLE ASSETS

Group	2022			2021		
	Cost / Valuation	Accumulated amortisation	Carrying value	Cost / Valuation	Accumulated amortisation	Carrying value
Intellectual property	124,283	(107,278)	17,005	124,283	(104,336)	19,947
Computer software	5,198	(4,232)	966	4,810	(2,979)	1,831
Total	**129,481**	**(111,510)**	**17,971**	**129,093**	**(107,315)**	**21,778**

Company	2022			2021		
	Cost / Valuation	Accumulated amortisation	Carrying value	Cost / Valuation	Accumulated amortisation	Carrying value
Computer software	2,189	(1,683)	506	2,031	(671)	1,360

Reconciliation of intangible assets - Group - 2022					
	Opening balance	Additions	Disposals	Amortisation	Total
Intellectual property	19,947	-	-	(2,942)	17,005
Computer software	1,831	670	(20)	(1,515)	966
	21,778	**670**	**(20)**	**(4,457)**	**17,971**

5. Intangible assets (continued)

Reconciliation of intangible assets - Group - 2021					
		Opening balance	Additions	Amortisation	Total
Intellectual property		25,390	-	(5,443)	19,947
Computer software		2,120	847	(1,136)	1,831
		27,510	**847**	**(6,579)**	**21,778**

Reconciliation of intangible assets - Company - 2022				
	Opening balance	Additions	Amortisation	Total
Computer software	1,360	158	(1,012)	506

Reconciliation of intangible assets - Company - 2021					
	Opening balance	Additions	Disposals	Amortisation	Total
Computer software	1,493	671	(133)	(671)	1,360

The intellectual property included production processes, drug master files, licenses, manufacturing techniques and technology purchased from external parties.

Amortisation is included in other operating expenses.

The remaining useful life is between 3 to 18 years.

The intellectual property was tested for impairment and did not show the need for any impairment to be done. The impairment test was done by comparing the carrying amount to the recoverable amount using the discounted cashflows. The 4 year budget, adjusted for the expected impact of Covid-19 on operations, was used and adjusted for expected inflation going forward for a period of 20 years. The product is expected to be in the market for this time. A growth rate equal to inflation was used for the periods beyond 4 years. The discount rate used is 15.95%

6. INTERESTS IN SUBSIDIARIES INCLUDING CONSOLIDATED STRUCTURED ENTITIES

The carrying amounts of subsidiaries are shown net of impairment losses.

The Directors' value of the investment in subsidiaries is equal to its carrying value.

Company					
Name of company	Held by	% holding 2022	% holding 2021	Carrying amount 2022	Carrying amount 2021
Pelchem SOC Limited	Necsa SOC Ltd	100.00%	100.00%	-	-
NTP Radioisotopes SOC Limited	Necsa SOC Ltd	100.00%	100.00%	220,700	220,700
Cyclofil SOC Limited	Necsa SOC Ltd	100.00%	100.00%	-	-
Arecsa SOC Limited	Necsa SOC Ltd	51.00%	51.00%	1	1
				220,701	**220,701**

7. INVESTMENT IN ASSOCIATE

The following table lists all of the associates in the group:

Group							
Name of company	Held by	% ownership interest 2022	% ownership interest 2021	Carrying amount 2022	Carrying amount 2021	Fair Value 2022	Fair Value 2021
Business Venture International No.33 (Pty) Ltd	Necsa SOC Ltd	42.00%	42.00%	2	2	2	2
Gamwave (formerly Cyclotope, a subsidiary)	NTP Radioisotopes SOC Ltd	40.00%	40.00%	-	-	-	-
Oserix	Gammatec NDT Supplies SOC Ltd	25.00%	25.00%	8,435	6,762	9,175	6,762
Element 42	Necsa SOC Ltd	50.00%	50.00%	-	-	-	-
				8,437	**6,764**	**9,177**	**6,764**

Group									
Name of company	Held by	% ownership interest 2022	% ownership interest 2021	Carrying amount 2022	Carrying amount 2021	Carrying amount 2020	Fair Value 2022	Fair Value 2021	Fair Value 2020
Business Venture International No.33 (Pty) Ltd	Necsa SOC Ltd	42.00%	42.00%	2	2	2	2	2	2

Oserix is an associate of Gammatec NDT Supplies SOC Ltd, which holds 25% of Oserix issued share capital. NTP Radioisotopes SOC Ltd holds 55% of Gammatec NDT Supplies SOC Ltd, therefore resulting in the group having significant influence over the associate.

The carrying amounts of Investments in Associates are shown net of impairment losses.

The Directors' value of the investment in associates is equal to its carrying value.

7. Investment in associate (continued)

Material associates

The following associates are material to the group:

Summarised financial information of material associates		
Summarised Statement of Profit or Loss and Other Comprehensive Income	**Oserix S.A**	
	2022	**2021**
Revenue	153,042	170,823
Other income and expenses	(138,766)	(158,937)
Profit before tax	14,276	11,886
Tax expense	(3,747)	(3,470)
Profit after tax	10,529	8,416
Total comprehensive income	**10,529**	**8,416**
Dividends received from associate	960	267

Summarised Statement of Financial Position	Oserix S.A	
	2022	**2021**
Assets		
Non-current	2,715	3,459
Current	61,323	59,959
Total assets	**64,038**	**63,418**
Liabilities		
Non-current	2,603	1,824
Current	26,709	32,069
Total liabilities	**29,312**	**33,893**
Total net assets	**34,726**	**29,525**

Reconciliation of net assets to equity accounted investments in associates	Oserix S.A		
	2022	**2021**	**2020**
Interest in associates at percentage ownership	8,435	6,762	4,925
Carrying value of investment in associate	8,435	6,762	4,925
Investment at beginning of period	6,762	4,925	4,331
Share of profit	2,633	2,104	627
Dividends received from associate	(960)	(267)	(33)
Investment at end of period	8,435	6,762	4,925

The end of the reporting year of Oserix S.A is 31 December 2021. It was impracticable to obtain financial statements as at 31 March 2022.

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

8. LOANS FROM GROUP COMPANIES

Subsidiaries

Pelchem SOC Limited	-	-	2,106	1,522
Medical Aid Cost Paid by Necsa on behalf of the subsidiaries. These funds were recovered from the subsidiaries. The balance outstanding is due to over/ under payment made by subsidiaries.				
NTP Radioisotopes SOC Limited	-	-	38,377	47,537
NTP initially granted Necsa an intercompany Loan at Prime minus 2% payable on 31 March 2019 with a main condition that any future dividends will be offset against the loan. Necsa has not been in a position to pay the entire loan. The loan repayment date was 31 March 2021 and is yet to be extended.				
NTP Radioisotopes SOC Limited	-	-	-	47
Medical Aid Cost Paid by Necsa on behalf of the subsidiaries. These funds recovered are from the subsidiaries. There balance outstanding is due to over/ under payment made by subsidiaries.				
	-	**-**	**40,483**	**49,106**
Split between non-current and current portions				
Current liabilities	-	-	40,483	49,106

9. FINANCIAL ASSETS AT FAIR VALUE

Equity investments at fair value through profit or loss	298,628	263,875	298,628	263,875
Debt investments at fair value through profit or loss	(76)	273	(76)	273
Equity investments at fair value through other comprehensive income	1,250	1,055	1,215	1,026
	299,802	**265,203**	**299,767**	**265,174**
Designated at fair value through profit or loss:				
Retention fees receivable	(76)	273	(76)	273
Retention fees receivable relates to contracts with clients where an amount is withheld until the quality conditions of the contracts have been fulfilled. The fair value approximates the carrying value.				
Mandatorily at fair value through profit or loss:				
Unit trusts	298,628	263,875	298,628	263,875
Equity investments at fair value through other comprehensive income:				
Listed shares	1,250	1,055	1,215	1,026
	299,802	**265,203**	**299,767**	**265,174**

9. Financial assets at fair value (continued)

Split between non-current and current portions				
Non-current assets	299,802	265,203	299,767	265,174

Fair value information

Refer to note 46&47 Fair value information and risk management for details of valuation policies and processes.

10. DEFERRED TAX

Deferred tax liability				
Property plant and equipment	(32,291)	(32,145)	-	-
Investments at fair value	(5)	(3)	-	-
ROU asset	(6352)	(7369)		
Prepayments	(289)	(97)		
Doubtful debt allowance	(9,035)	(5,517)	-	-
Revaluation reserve	(2,200)	(2,198)	-	-
Revaluation of property	(2,030)	(2,688)	-	-
Section 24C	(1,098)	(2,321)		
Forex adjustment	(1,005)	(1,042)	-	-
	(54,305)	**(53,380)**	**-**	**-**
Deferred tax asset				
Provision for leave pay	8,738	491	-	-
Lease liability	6,356	7,339	-	-
Provision for variable pay and bonuses	8,670	9,766	-	-
Tax loss carried forward	57,719	87,829	-	-
Tax losses to be utilised in future	7,590	-	-	-
Inventory impairments	4,621	4,489	-	-
Income received in advance	1,569	2,742	-	-
Provision for doubtful debt	561	274	-	-
Trade receivables with credit losses	290	4,524	-	-
Loss allowance on trade receivables	94	8,739	-	-
Property plant and equipment	1,494	5,054	-	-
Provision for expected credit losses	22,588	9,200	-	-
Provision for 13th cheque	892	37	-	-
Provision for incentive scheme	729	1,327	-	-
Provision for bonus	3,884	1,510	-	-
Retirement benefit liability	7,035	7,577	-	-
Provision for waste disposal	27,803	27,442	-	-
Other personnel provisions	367	274	-	-
	161,000	**178,614**	**-**	**-**
Total deferred tax	**106,695**	**125,234**	**-**	**-**
Net deferred tax				
Entities with net deferred tax liability	(1,648)	(1,474)	-	-
Entities with net deferred tax asset	108,343	126,708	-	-
	106,695	**125,234**	**-**	**-**

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

11. INVENTORIES

Raw materials, components	6,895	5,643	-	-
Work in progress	24,590	29,051	24,388	27,349
Finished goods	31,053	28,300	-	-
Life science products and equipment	9,064	14,620	-	-
Production supplies	15,517	15,687	-	-
Goods in transit	241,108	264,498	-	-
Consumables	32,777	47,085	32,842	31,668
Other inventories for sale	1,171	723	-	-
	362,175	405,607	57,230	59,017
Allowance for slow moving stock	(41,725)	(41,008)	(6,024)	(5,493)
Total inventories at the lower of cost and net realisable value	**320,450**	**364,599**	**51,206**	**53,524**
Impaired amount of categories of inventory				
Finished goods	23,108	41,008	6,024	5,493
Production supplies	13,002	-	-	-
Consumables	5,615	-	-	-
	41,725	**41,008**	**6,024**	**5,493**

Amounts recognised in profit or loss

Write-downs for slow moving inventories to net realisable value amounted to R6 024 (2021 : R5 493) for the company and R41 725 (2021 : R41 008) for the Group. These were recognised as an expense during the year ended 31 March 2022, in cost of sales.

12. TRADE AND OTHER RECEIVABLES

Financial instruments:				
Trade receivables	364,472	381,074	422,123	433,543
Loss allowance	(112,454)	(72,872)	(329,563)	(262,840)
Trade receivables at amortised cost	252,062	308,202	92,560	170,703
Deposits	78	79	18	18
Staff fuel debtors	1,689	1,515	1,689	1,515
Other receivables	-	3,796	-	-
Other receivables Staff	3,706	5,961	11,955	4,061
Non-financial instruments:				
VAT	22,014	29,778	-	-
Total trade and other receivables	**279,549**	**349,331**	**106,222**	**176,297**

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

12. Trade and other receivables (continued)

Trade and other receivables pledged as security

No trade and other receivables have been pledged as security.

Classification as Trade Receivables

Trade receivables are amounts due from customers for goods sold or services performed in the ordinary course of business. They are generally due for settlement within 30 dayst. Trade receivables are recognised initially at the amount of consideration that is unconditional, unless they contain significant financing components, when they are recognised at fair value. The Group holds the trade receivables with the objective of collecting the contractual cash flows and therefore measures them subsequently at amortised cost using the effective interest method. Details about the Group's impairment policies and the calculation of the loss allowance are provided below.

Included in other receivables are sundry debtors and other miscellaneous items, of which sundry debtors form the biggest part of the total.

Approximate fair value of trade and other receivables				
Trade and other receivables	279,549	349,331	106,222	176,297

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

Due to the short-term nature of the current receivables, their carrying amount is considered to be the same as their fair value.

The Group applies the IFRS 9 simplified approach to measuring expected credit losses which uses a lifetime expected loss allowance for all trade receivables

The recoverability of customers with outstanding balances of over R 100 000 were individually assessed, taking each individual customer's circumstances into account. Balances which were older than 90 days for customers with a balances of less than R 100 000 each, were provided for as expected credit losses. The recoverability of customers with outstanding balances of over R 100 000 were individually assessed, taking each individual customer's circumstances into account.

On that basis, the loss allowance as at 31 March 2022 was determined as follows for trade receivables:

12. Trade and other receivables (continued)

Trade Receivables Credit Risk						
Group						
2022	**Current**	**1-30 days**	**31-60 days**	**61-90 days**	**90 days**	**Total**
Gross Carrying amount	240,683	52,280	8,022	8,031	55,500	364,516
Expected loss rate	10.41%	30.32%	100.00%	100.00%	100.00%	30.85%
Loss allowance	**25,050**	**15,853**	**8,022**	**8,031**	**55,500**	**112,456**

2021	**Current**	**1-30 days**	**31-60 days**	**61-90 days**	**90 days**	**Total**
Gross Carrying amount	155,711	63,759	17,586	9,850	134,168	381,074
Expected loss rate	0.1%	0.1%	1.1%	1.2%	53.8%	19.12%
Loss Allowance	**246**	**69**	**210**	**122**	**72,225**	**72,872**

NECSA						
2022	**Current**	**1-30 days**	**31-60 days**	**61-90 days**	**90 days**	**Total**
Gross Carrying amount	90,999	4,118	5,216	4,327	294,672	422,123
Expected Loss Rate	25.8%	75.3%	82.9%	90.8%	100.00%	78.07%
Loss Allowance	**23,529**	**3,102**	**4,328**	**3,932**	**294,672**	**329,563**

2021	**Current**	**1-30 days**	**31-60 days**	**61-90 days**	**90 days**	**Total**
Gross Carrying amount	125,817	2,952	3,996	1,740	278,231	433,543
Expected Loss Rate					94.00%	64.00%
Loss Allowance	**-**	**-**	**-**	**-**	**262,840**	**262,840**

The Group writes off debtors based on a line by line basis on amounts greater than R100 000 in the over 90 days aging bracket, taking into consideration whether the debtor is in severe financial difficulty and whether there is no realistic prospect of recovery.

The loss allowances for trade receivables as at 31 March 2022 reconcile to the opening loss allowances as follows:

Opening loss allowance at 1 April	72,872	89,913	262,840	291,292
Increase in loss allowance recognised in profit or loss during the year	55,223	13,634	66,723	-
Unused amounts reversed through profit and loss	(15,641)	(30,675)	-	(28,452)
	112,454	**72,872**	**329,563**	**262,840**

Trade receivables are written off where there is no reasonable expectation of recovery. Indicators that there is no reasonable expectation of recovery include, amongst others, the failure of a debtor to engage in a repayment plan with the Group, and a failure to make contractual payments for a period of greater than 90 days past due.

These definitions for defaults as aforementioned were selected, because they are expected to result in the most accurate measurement of the expected credit loss.

Impairment losses on trade receivables are presented as net impairment losses within operating profit. Subsequent recoveries of amounts previously written off are credited against the same line item.

	Group		Company	
	2022	2021	2022	2021
	R '000	R '000	R '000	R '000

13. CASH AND CASH EQUIVALENTS

Cash and cash equivalents consist of:

Cash on hand	75	88	62	67
Bank balances	126,170	77,886	33,757	21,084
Short-term deposits	102,178	93,785	-	-
Bank overdraft	(14,007)	(13,976)	-	-
	214,416	**157,783**	**33,819**	**21,151**
Current assets	228,423	171,759	33,819	21,151
Current liabilities (1)	(14,007)	(13,976)	-	-
	214,416	**157,783**	**33,819**	**21,151**
Current liabilities				
Pelchem	(14,000)	(13,972)	-	-
The Nuclear Energy Corporation of South Africa SOC Limited has signed suretyship for the R14,000 overnight facility. The overnight facility is reviewed once a year by Nedbank. There are no set repayment terms on the overdraft and the interest is charged at prime plus 0.5%				
Arecsa	(7)	(4)	-	-
Overdraft account with ABSA.				
	(14,007)	**(13,976)**	**-**	**-**

Details of facilities

The overdraft facility was revoked during the 2019/20 financial year. This was due to market fluctuations during the height of the COVID-19 pandemic influencing the markets. There are no set repayment terms of the overdraft and interest is charged at prime less 1.5%. There is no restrictions on the realisability of any of the cash and cash equivalents. The credit quality of cash at bank and short term deposits, excluding cash on hand is assessed by reference to external credit ratings (if available) or historical information about counterparty default rates:

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

13. Cash and cash equivalents (continued)

Asset based financing	4,000	4,000	899	4,000
Bills of exchange	100	100	-	-
CFC	2,000	2,000	-	-
Forex-potential future exposure trading limits	-	1,280	-	-
Commitments regarding guarantees (local)	22,200	2,200	-	-
Corporate credit card	5,111	5,111	5,000	5,000
FEC's	67,115	65,835	35,000	35,000
Fleet management service	145	145	-	-
Forex cancellation limit	750	750	-	-
Forex settlement limit	7,000	7,000	-	-
General short term banking facility	6,000	6,000	5,000	5,000
Letter of Guarantee	11,300	32,000	-	-
Letter of credit	450	450	-	-
Overdraft	11,500	16,500	-	-
Vehicle and asset finance	5,290	5,290	-	-
Financial assets pledged as collateral	32,000	-	-	-
	174,761	**148,661**	**45,899**	**49,000**

14. DISCONTINUED OPERATIONS OR DISPOSAL GROUPS OR NON-CURRENT ASSETS HELD FOR SALE

Assets and liabilities

Assets of disposal groups

Other assets (Net)	-	716	-	-

Liabilities of disposal groups

Other liabilities (Net)	-	51	-	-

Equity

The Board of Gammatec Middle East General Trading LLC and the Board of Gammatec NDT Supplies SOC Ltd resolved to discontinue all direct operations of Gammatec Middle East General Trading LLC during the 2018 financial year. The assets and liabilities as at 31 March 2022 are set out above. The decision was made to discontinue operations due to the lack of return and suitable profitable trading activities. Gammatec East General Trading LLC has been liquidated during the 2021 financial year end.

Gammatec Aseana NDT Supplies SDN.BHD, after the final settlement of trade receivables, trade payables and final dividend distribution Gammatec Aseana NDT Supplies SDN.BHD. Gammatec Aseana NDT Supplies SDN. BHD has applied for liquidation and the liquidation was finalised within the 2022 financial year.

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

15. SHARE CAPITAL

Authorised				
500 000 000 ordinary shares at R1 each	500,000	500,000	500,000	500,000
Reconciliation of number of shares issued:				
Reported as at 01 April 2022	2,205	2,205	2,205	2,205
Issued				
Ordinary	2,205	2,205	2,205	2,205

16. LEASES AND RIGHT-OF-USE ASSETS

Right-of-use assets are presented as a separate line item on the statement of financial position.

Net carrying amounts of right-of-use assets

The carrying amounts of right-of-use assets are as follows:

Buildings	438	639	-	-
Motor vehicles	6,801	6,128	6,104	5,309
Equipment	10,590	9,914	10,590	9,914
	17,829	**16,681**	**16,694**	**15,223**
Additions to right-of-use assets				
Buildings	-	657	-	-
Motor vehicles	3,140	1,186	3,140	970
Equipment	-	251	-	251
	3,140	**2,094**	**3,140**	**1,221**

Depreciation recognised on right-of-use assets

Depreciation recognised on each class of right-of-use assets, is presented below. It includes depreciation which has been expensed in the total depreciation charge in profit or loss (note 33), as well as depreciation which has been capitalised to the cost of other assets.

Buildings	220	206	-	-
Motor vehicles	2,468	1,515	2,345	1,342
Office equipment	(675)	1,716	(675)	1,716
	2,013	**3,437**	**1,670**	**3,058**

Other disclosures

Leases of low value assets included in cost of merchandise sold and inventories	(2,954)	(2,402)	-	-

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

16. Leases and right-of-use assets (continued)

Leases and right-of-use assets

The maturity analysis of lease liabilities is as follows:

Within one year	1,899	1,847	1,461	2,238
Two to five years	3,022	776	2,584	1,097
	4,921	2,623	4,045	3,335
Less finance charges component	(617)	(415)	(558)	(279)
	4,304	**2,208**	**3,487**	**3,056**
Non-current liabilities	2,752	606	2,325	989
Current liabilities	1,552	1,602	1,162	2,067
	4,304	**2,208**	**3,487**	**3,056**

17. RETIREMENT BENEFITS

The Company and its two major subsidiaries, NTP Radioisotopes and Pelchem, operate a provident fund scheme which is governed by the Pensions Fund Act No. 24 of 1956. The scheme is generally funded through payments to insurance companies or trustee administered funds, determined by periodic actuarial calculations. The Company has defined contribution plans established in 1994. These contribution plans are compulsory for every permanent employee employed in accordance with the conditions of employment, primarily by means of monthly contributions to the Necsa Retirement Fund. A defined contribution plan is a provident fund under which the Company pays fixed contributions into a separate entity. The Company has no legal or constructive obligations to pay further contributions if the fund does not hold sufficient assets to pay all employees the benefits relating to employee services in the current and prior periods. The contributions are recognised as an expense when they are due. Prepaid contributions are recognised as an asset to the extent that a cash refund or a reduction in the future payments is available.

The Necsa Retirement Fund is revalued by an independent Actuary on an annual basis. The last actuarial valuation was performed in April 2022 for the year ending 31 March 2022. The conclusion made in the latest actuarial valuation was that the Fund is currently in a good financial position and should remain so, based on the contribution rates payable in terms of the rules of the Fund, until the next actuarial valuation.

Defined benefit plan

NECSA and its two major subsidiaries, NTP Radioisotopes and Pelchem's post-employment health care liabilities consists of a commitment to pay a portion of the members' post-employment medical scheme contributions. This liability is also generated in respect of independants who are offered continued membership of the medical scheme on the death of the primary member. The schemes have been valued per individual entity namely NECSA, NTP Radioisotopes and Pelchem, which reflects the group figures. These schemes have been disclosed separately below.

17. Retirement benefits (continued)

Members employed before 1 September 2004 are entitled to a 100% subsidy of medical scheme contributions in retirement, provided they have been members of the medical scheme for at least 10 years. Should a member be on the medical scheme for less than 10 years at retirement, they will be entitled to a 10% subsidy for each year they were active on the medical scheme during employment at NECSA.

Eligible members receive a Rand amount based on the Essential Core option's contributions in 2005, increasing annually in line with consumer price inflation (CPI). The Rand amounts for 2022 are R1,449 per month for a single member and R2,387 for a married member. The child dependant subsidy for 2022 is R606 per month.

If a member qualifies to upgrade to a Comprehensive option as per the subsidy rules then NECSA will subsidise an additional Rand amount for the upgrade. The additional Rand amounts for members on the Classic Comprehensive option in 2022 are R809 per month for a single member and R1,470 per month for a married member. The additional Rand amounts for members on the Essential Comprehensive option in 2022 are R820 for a single member and R1,483 per month for a married member.

Members who do not qualify for an upgrade to a Comprehensive option or who do not belong to a Comprehensive option receive an additional Rand amount for the Medical Savings Account (MSA) contributions. The additional Rand amount for 2022 is R701 per member, irrespective of marital status.

Members who retired before 1 July 1990, referred to as the Old 100% Group, receive an additional Rand amount of R271 for 2022, irrespective of marital status.

Dependants of eligible continuation members receive a subsidy before and after the death of the principal member.

Note: The Rand amounts above are based on year on year CPI inflation to September 2021.

NECSA and its two major subsidiaries, NTP Radioisotopes and Pelchem's subsidy of its current employees' future post-employment medical scheme contributions and current pensioners' medical scheme contributions presents certain risks to the Company, the most significant of which are summarised below. The majority of these risks mainly apply to the Pelchem group only as there is no plan asset arrangment in respect of the group.

17. Retirement benefits (continued)

Subsidy inflation	The post-employment health care liability is linked to consumer price inflation. Higher consumer price inflation than expected will lead to higher liabilities.
Longevity	The employer's subsidy covers the post-employment medical scheme contributions in retirement until the main pensioner's death. On the main pensioner's death the subsidy will continue at a reduced level based on the contributions for the remaining dependants. The longevity risk is the risk that pensioners will live longer than expected. Possible contributing factors are medical advances, better health care and greater emphasis on following healthier lifestyles. This would lead to benefits being payable for longer than expected.
Cash flow risk	The employer pays the subsidy amounts in respect of the pensioners either directly to the pensioner or to the medical aid. There is a risk to the employer that, due to unforeseen circumstances, funds may not be available at the time that they are required.
Changes in bond yields and CPI	A decrease in the bond yields used to determine the discount rate will increase the employer's reported post-employment health care liability. An increase in CPI will result in a higher subsidy inflation assumption, which consequently will lead to a higher reported post- employment health care liability. High volatility in the above rates may lead to volatile balance sheet and income statement disclosures.
Future changes in legislation	The Government's stated intention to implement a National Health Insurance system in the near future may lead to a requirement to provide some level of compensation to eligible members or to fund additional amounts into the system. Furthermore, changes in tax legislation affecting the subsidy may also pose a risk to both the employer and the recipients of the subsidy.

Company developments:

Necsa purchased additional annuities with effect from 1 May 2020 to cater for new retirements since the previous purchase. In addition, contributions were also made towards the recurring premium contracts in place. Furthermore, annuities were also purchased in respect of new retirees for NECSA's subsidiary, NTP Radioisotopes.

The most recent actuarial valuation of the plan assets and the present value of the defined benefit obligation were carried out at 31 March 2022 by Mr Sean Neethling, Fellow of the Institute of Actuaries of South Africa. The present value of the defined benefit obligation, and the related current service cost and past service cost, were measured using the projected unit credit method. MCA also undertook the previous valuation for NECSA and its two major subsidiaries, NTP Radioisotopes and Pelchem as at 31 March 2022.

Momentum Consultants and Actuaries (MCA) quantify the present value of post-employment health care liabilities in terms of IAS19 for:

a) Current continuation members.

b) Future continuation members emanating from the current active medical scheme members employed by NECSA.

In particular,the funded status of the post-employment plan as at the valuation date will be determined and compared to the projected liability, calculated as at 31 March 2021. An expense for the 2020/21 financial year will be derived and a projected expense for the forthcoming year will be calculated for budget purposes. The report complies with the relevant professional guidance from the Actuarial Society of South Africa as described in Advisory Practice Note APN301.

The principal assumptions used for the purposes of the actuarial valuations for NECSA and its two major subsidiaries, NTP Radioisotopes and Pelchem were as follows.

17. Retirement benefits (continued)

	Valuation at		
Economic assumptions:	**2022**	**2021**	**2020**
Discount rate (D)	10.75%	11.00%	12.50%
Consumer Price Index (CPI)*	5.95%	6.90%	7.10%
Subsidy contribution increase rate (H)	5.95%	6.90%	7.10%
Net discount rate ((1+D)/(1+H)-1)	4.53%	3.84%	5.04%
Expected return in Plan Assets	10.75%	11.00%	12.50%

* This is the market expectation of long-term CPI.

We have estimated the total duration of the liability to be 9.7 years, based on the previous valuation results.

The rates derived are based on prevailing yields as at 31 March 2022. We used a convention of rounding the discount rate, price inflation and subsidy increase rates to the nearest 0.05%. In the previous valuation these rates were rounded to the nearest 0.1%. The net discount rate is rounded to the nearest 0.01%.

While it is essential that the assumptions are individually justifiable, it is the relative levels of the discount rate and health care cost inflation to one another that are important in the determination of the liability, rather than the nominal values.

Discount rate

We have derived the discount rate from the BEASSA zero-coupon yield curve. We used the spot rate on the nominal curve with duration equal to the rounded liability duration of 9.75 (9.7 years rounded to the nearest 0.25 years) to derive the discount rate of 10.75% per annum.

Price index inflation

The market expectation of long-term price inflation of 5.95% per annum was derived from the differential between the nominal yield curve and real yield curve at the same duration. An allowance for an inflation risk premium of 0.50% was introduced.

Subsidy contribution increase rate

The subsidy increase rate was set at price inflation.

Expected return on Plan Assets

The expected return on Plan Assets was set at the discount rate.

Comparison to previous valuation

In the current valuation an allowance for an inflation risk premium of 0.5% was introduced. This results in a lower price inflation assumption, lower subsidy increase rate, higher net discount rate and consequently a lower value placed on the liabilities. No inflation risk premium was allowed for in the previous valuation. The current valuations rounds the discount rate, price inflation and subsidy increase rate to the nearest 0.05%. The previous valuation rounded these rates to the nearest 0.1%. The other financial assumptions have been set on a consistent basis with the previous year's valuation.

17. Retirement benefits (continued)

	Valuation at		
Demographic assumptions:	**2022**	**2021**	**2020**
Expected retirement age (Males and females)	65.00	65.00	65.00

Family structure

	Current valuation	
	Active members	**Pensioners**
Age difference between husband and wife	Actual ages used if available / Husband 4 years older than wife	Actual ages used
Proportion married	Assumed 90% married at retirement	Actual marital status used

In valuing the death-in-service healthcare liability, it is necessary to make a number of additional assumptions. We assumed that the percentage married of active members increases from 0% at age 21 to 90% at age 45 and stays at 90% until retirement. We have assumed the following percentage married for valuing death-in-service healthcare liability.

Example at stated age	Proportion married
21	0%
25	15%
30	34%
35	53%
40	71%
45+	90%

We have assumed that pensioner's children and orphans will be subsidised until the age of 21. We have not made any allowance for active members to have child dependants in retirement.

Continuation percentages:

We assumed that 0% of current in-service members eligible for a retirement subsidy would discontinue medical scheme membership upon reaching retirement with NECSA on the grounds of affordability. Similarly, we assumed that 0% of dependants of current in-service members eligible for a death-in-service subsidy would discontinue medical scheme membership on the grounds of affordability upon the death-in-service of the principal member.

The demographic assumptions are the same as those used in the previous valuation.

	Valuation at		
Decrement assumptions:	**2022**	**2021**	**2020**
Mortality rates			
Active members	SA 85-90 (Light)	SA 85-90 (Light)	SA 85-90 (Light)
Pensioners	PA (90) rated down 2 years	PA (90) rated down 2 years	PA (90) rated down 2 years

In addition to the above pensioner mortality assumption, we have made allowance for 1.00% p.a. improvement in mortality. We have used a base year of 2006 (i.e. as at valuation date there has been 13 years of mortality improvements).

17. Retirement benefits (continued)

Based on the above post-retirement mortality table the life expectancy of a 65 year old male is 18.2 years and for a 65 year old female it is 22.6 years.

Withdrawal rates

Example at stated age	Withdrawal rates
20	15%
25	10%
30	7%
35	4%
40	2%
45+	0%

The decrement assumptions are the same as those used in the previous valuation.

Reconciliation of assets and liabilities recognised on the Statement of financial position				
Present value of funded obligatios	(326,030)	(342,002)	(280,938)	(295,614)
Fair value of plan assets	36,908	28,557	17,872	9,229
	(289,122)	**(313,445)**	**(263,066)**	**(286,385)**
Non-current assets	36,908	8,252	17,872	9,229
Non-current liabilities	(299,289)	(278,141)	(256,755)	(271,699)
Current liabilities	(26,741)	(43,556)	(24,183)	(23,915)
	(289,122)	**(313,445)**	**(263,066)**	**(286,385)**

Reconciliation of net liability recognised on the Statement of financial position				
Opening balance	313,445	290,507	286,385	268,921
Interest cost	36,084	37,178	31,113	32,632
Current service cost	2,383	2,364	1,824	1,847
Expected return on Plan Assets	(5,148)	(4,998)	(3,079)	(3,081)
Net annual cost recognised in profit or loss	33,319	34,544	29,858	31,398
Actuarial (gains)/loss recognised through OCI	(24,493)	25,174	(21,647)	21,539
Expected employer benefit payments	(27,584)	23,452	(25,196)	25,543
Benefit payments from Plan Assets	26,225	(24,560)	25,196	(25,543)
Employer prefunding / additional contributions	(31,790)	(35,672)	(31,530)	(35,473)
	289,122	**313,445**	**263,066**	**286,385**

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

17. Retirement benefits (continued)

Reconciliation of present value of obligations in excess of Plan Assets				
Opening balance	313,445	290,507	286,385	268,921
Interest cost	36,103	37,178	31,132	32,632
Current service cost	2,383	2,364	1,824	1,847
Expected return on Plan Assets	(5,167)	(4,998)	(3,098)	(3,081)
Actuarial (gain)/loss	(24,493)	25,174	(21,647)	21,539
Expected employer benefit payments from Plan Assets	26,225	26,526	25,196	25,543
Expected employer benefit payments	(27,584)	(27,634)	(25,196)	(25,543)
Employer prefunding contributions	(31,790)	(35,672)	(31,530)	(35,473)
	289,122	**313,445**	**263,066**	**286,385**

Sensitivity analysis:

Company:

The liability derived by this valuation is dependent on the assumptions set out above, which may or may not be borne out in practice. Variations from these assumptions will emerge in future years as experience gains or losses and will be recognised by NECSA in accordance with its accounting policies.

The valuation results are sensitive to changes in the underlying assumptions. The effects of varying these assumptions are illustrated below.

The sensitivity analyses are based on a change in an assumption while holding all other assumptions constant. In practice, this is unlikely to occur, and changes in some of the assumptions may be correlated. This is a limitation of a sensitivity analysis.

Discount rate

The table below shows the impact of a 1% increase and decrease in the discount rate.

	1% decrease R'000	Valuation basis R'000	1% increase R'000
Employer's accrued liability	305,941	280,938	259,306
Employer's service and interest cost	30,672	30,649	30,571

Therefore, a 1% increase in the discount rate assumption will result in a 7.7% decrease in the accrued liability. Similarly, a 1% decrease in the discount rate assumption will result in a 8.9% increase in the accrued liability.

Price inflation

The valuation basis assumes that the employer's medical subsidy contribution rate will increase in line with consumer price inflation annually. The effect of a 1% increase and decrease in the inflation rate is as follows:

	1% decrease R'000	Valuation basis R'000	1% increase R'000
Employer's accrued liability	258,744	280,938	306,222
Employer's service and interest cost	28,026	30,649	33,656

17. Retirement benefits (continued)

Therefore, a 1% increase in the inflation rate assumption will result in an 9.0% increase in the accrued liability. Similarly, a 1% decrease in the inflation rate assumption will result in a 7.9% decrease in the accrued liability.

Mortality

The table below shows the impact of changing the mortality basis from PA(90)-2 with a 1.0% improvement, to PA(90)-3 with a 1.0% improvement and PA(90)-1 with a 1.0% improvement.

	PA(90) ñ 3* R'000	Valuation basis R'000	PA(90) ñ 1* R'000
Employer's accrued liability	289,647	280,938	272,229
Employer's service and interest cost	31,624	30,649	29,674

*The mortality basis includes mortality improvements of 1.0% per annum, with a base year of 2006.

Therefore, a one year down-rating in the post-retirement mortality assumption will result in a 3.1% increase in accrued liability. Similarly, a one year upward-rating in the post-retirement mortality assumption will result in a 3.1% decrease in the accrued liability.

A one year down-rating of the mortality assumption, assumes that a person currently aged x will experience mortality equivalent to that of a person aged x-1.

Expected retirement age

The table below shows the impact of a 1 year increase and decrease in the average retirement age assumption (which is the age that the liability is assumed to be fully accrued). The impact of reducing the average retirement age by two years is also shown in the table below. The average retirement age is assumed to be 65 years.

	1 year younger R'000	Valuation basis R'000	1 year older R'000
Employer's accrued liability	284,871	280,938	276,443
Employer's service and interest cost	30,956	30,649	30,126

Therefore, an increase of 1 year in the average retirement age assumption will result in a 1.6% decrease in the accrued liability. Similarly, a decrease of 1 year in the average retirement age assumption will result in a 1.4% increase in the accrued liability.

Group:

Discount rate

The table below shows the impact of a 1% increase and decrease in the discount rate.

	1% decrease R'000	Valuation basis R'000	1% increase R'000
Employer's accrued liability	356,387	326,030	299,934
Employer's service and interest cost	36,007	35,822	35,596

Therefore, a 1% increase in the discount rate assumption will result in a 8.6% decrease in the accrued liability. Similarly, a 1% decrease in the discount rate assumption will result in a 9.3% increase in the accrued liability.

17. Retirement benefits (continued)

Price inflation

The valuation basis assumes that the employer's medical subsidy contribution rate will increase in line with consumer price inflation annually. The effect of a 1% increase and decrease in the inflation rate is as follows:

	1% decrease R'000	Valuation basis R'000	1% increase R'000
Employer's accrued liability	299,258	326,030	356,740
Employer's service and interest cost	32,640	35,822	39,496

Therefore, a 1% increase in the inflation rate assumption will result in a 9.4% increase in the accrued liability. Similarly, a 1% decrease in the inflation rate assumption will result in a 8.26% decrease in the accrued liability.

Mortality

The table below shows the impact of changing the mortality basis from PA(90)-2 with a 1.0% improvement, to PA(90)-3 with a 1.0% improvement and PA(90)-1 with a 1.0% improvement.

	PA(90) ñ 3* R'000	Valuation basis R'000	PA(90) ñ 1* R'000
Employer's accrued liability	335,790	326,030	316,255
Employer's service and interest cost	36,920	35,822	34,724

*The mortality basis includes mortality improvements of 1.0% per annum, with a base year of 2006.

Therefore, a one year down-rating in the post-retirement mortality assumption will result in a 3.0% increase in accrued liability. Similarly, a one year upward-rating in the post-retirement mortality assumption will result in a 3.0% decrease in the accrued liability.

A one year down-rating of the mortality assumption, assumes that a person currently aged x will experience mortality equivalent to that of a person aged x-1.

Expected retirement age

The table below shows the impact of a 1 year increase and decrease in the average retirement age assumption (which is the age that the liability is assumed to be fully accrued). The impact of reducing the average retirement age by two years is also shown in the table below. The average retirement age is assumed to be 65 years.

	1 year younger R'000	Valuation basis R'000	1 year older R'000
Employer's accrued liability	330,935	326,030	320,400
Employer's service and interest cost	36,260	35,822	35,167

Therefore, an increase of 1 year in the average retirement age assumption will result in a 1.7% decrease in the accrued liability. Similarly, a decrease of 1 year in the average retirement age assumption will result in a 1.5% increase in the accrued liability.

17. Retirement benefits (continued)

NTP Radioisotopes

Discount rate

The table below shows the impact of a 1% increase and decrease in the discount rate.

	1% decrease R'000	Valuation basis R'000	1% increase R'000
Employer's accrued liability	21,218	19,036	17,206
Employer's service and interest cost	2,265	2,203	2,146

Therefore, a 1% increase in the discount rate assumption will result in a 9.6% decrease in the accrued liability. Similarly, a 1% decrease in the discount rate assumption will result in a 11.5% increase in the accrued liability.

Price inflation

The valuation basis assumes that the employer's medical subsidy contribution rate will increase in line with consumer price inflation annually. The effect of a 1% increase and decrease in the inflation rate is as follows:

	1% decrease R'000	Valuation basis R'000	1% increase R'000
Employer's accrued liability	17,160	19,036	21,245
Employer's service and interest cost	1,972	2,203	2,477

Therefore, a 1% increase in the inflation rate assumption will result in a 11.6% increase in the accrued liability. Similarly, a 1% decrease in the inflation rate assumption will result in a 9.9% decrease in the accrued liability.

Mortality

The table below shows the impact of changing the mortality basis from PA(90)-2 with a 1.0% improvement, to PA(90)-3 with a 1.0% improvement and PA(90)-1 with a 1.0% improvement.

	PA(90) ñ 3* R'000	Valuation basis R'000	PA(90) ñ 1* R'000
Employer's accrued liability	19,513	19,036	18,553
Employer's service and interest cost	2,259	2,203	2,147

*The mortality basis includes mortality improvements of 1.0% per annum, with a base year of 2006.

Therefore, a one year down-rating in the post-retirement mortality assumption will result in a 2.5% increase in accrued liability. Similarly, a one year upward-rating in the post-retirement mortality assumption will result in a 2.5% decrease in the accrued liability.

A one year down-rating of the mortality assumption, assumes that a person currently aged x will experience mortality equivalent to that of a person aged x-1.

17. Retirement benefits (continued)

Expected retirement age

The table below shows the impact of a 1 year increase and decrease in the average retirement age assumption (which is the age that the liability is assumed to be fully accrued). The impact of reducing the average retirement age by two years is also shown in the table below. The average retirement age is assumed to be 65 years.

	1 year younger R'000	Valuation basis R'000	1 year older R'000
Employer's accrued liability	19,615	19,036	18,515
Employer's service and interest cost	2,278	2,203	2,135

Therefore, an increase of 1 year in the average retirement age assumption will result in a 2.7% decrease in the accrued liability. Similarly, a decrease of 1 year in the average retirement age assumption will result in a 3% increase in the accrued liability.

Pelchem

Discount rate

The table shows the impact of a 1% increase and decrease in discount rate.

	1% decrease R'000	Valuation basis R'000	1% increase R'000
Employer's accrued liability	29,228	26,056	23,422
Employer's service and interest cost	3,070	2,970	2,879

Therefore, a 1% increase in the discount rate assumption will result in a 10.1% decrease in the accrued liability. Similarly, a 1% decrease in the discount rate assumption will result in a 12.2% increase in the accured liability.

Price inflation

The valuation basis assumes that the employer's medical subsidy contribution rate will increase in line with consumer price inflation annually. The effect of a 1% increase and decrease in the inflation rate is as follows:

	1% decrease R'000	Valuation basis R'000	1% increase R'000
Employer's accrued liability	23,354	26,056	29,273
Employer's service and interest cost	2,642	2,970	3,363

Therefore, a 1% increase in the inflation rate assumption will result in a 12.3% increase in the accrued liability. Similarly, a 1% decrease in the inflation rate assumption will result in a 10.4% decrease in the accrued liability.

Mortality

The table below shows the impact of changing the mortality basis from PA(90)-2 with a 1.0% improvement, to PA(90)-3 with a 1.0% improvement and PA(90)-1 with a 1.0% improvement.

	PA(90) ñ 3* R'000	Valuation basis R'000	PA(90) ñ 1* R'000
Employer's accrued liability	26,630	26,056	25,473
Employer's service and interest cost	3,037	2,970	2,903

*The mortality basis includes mortality improvements of 1.0% per annum, with a base year of 2006.

17. Retirement benefits (continued)

Therefore, a one year down-rating in the post-retirement mortality assumption will result in a 2.2% increase in accrued liability. Similarly, a one year upward-rating in the post-retirement mortality assumption will result in a 2.2% decrease in the accrued liabilty.

A one year down-rating of the mortality assumption, assumes that a person currently aged x will experience mortality equivalent to that of a person aged x-1.

Expected retirement age

The table below shows the impact of a 1 year increase and decrease in the average retirement age assumption (which is the age that the liability is assumed to be fully accrued). The impact of reducing the average retirement age by two years is also shown in the table below. The average retirement age is assumed to be 65 years.

	1 year younger R'000	Valuation basis R'000	1 year older R'000
Employer's accrued liability	26,449	26,056	25,442
Employer's service and interest cost	3,026	2,970	2,906

Therefore, an increase of 1 year in the average retirement age assumption will result in a 2.4% decrease in the accrued liability. Similarly, a decrease of 1 year in the average retirement age assumption will result in a 1.5% increase in the accrued liability.

Company

NECSA purchased an insurance policy in the form of a company-owned annuity policy, which qualifies as a Plan Asset, effective as at 1 March 2011. Following this, nine further policies were purchased with effective dates of 1 July 2012, 1 May 2013, 1 May 2014, 1 May 2015, 1 May 2016, 1 May 2017, 1 May 2018, 1 May 2019, 1 May 2020 and 1 May 2021.

As at 31 March 2022, the policy value of the Plan Asset provided by the insurer was R11,341,019.

The annuity portfolio is made up of a growth account and a guaranteed account. Increases are guaranteed at a minimum of CPI per annum. The growth account may be used for interim subsidies for new retirees until the annual annuity purchase.

	31 March 2022 R'000	31 March 2021 R'000
Guaranteed account	11,322	2,980
Growth account	19	218
Market value of Plan Asset	**11,341**	**3,198**

IAS 19 requires Plan Assets to be accounted for at fair value. To ensure comparability and consistency between the asset and liability valuation, the fair value of the Guaranteed Account was calculated as the present value of the liabilities (only for pensioners already on the Momentum annuity policy) using current valuation assumptions, less the present value of future outstanding premiums (after deducting administration costs, solvency and profit margins in the future premiums). For this, we have assumed admin costs of 2.95% and another 8.75% margin to cover solvency and profit margins. The fair value of the Growth Account was set at the market value.

17. Retirement benefits (continued)

The fair value of the Plan Asset is therefore set as follows:

	31 March 2022 R'000	31 March 2021 R'000
Guaranteed account	17,853	9,011
Growth account	19	218
Fair value of Plan Asset	**17,872**	**9,229**

The table below shows the reconciliation of the Plan Assets from opening to closing balance:

Reconciliation of Plan Assets	31 March 2022 R'000	31 March 2021 R'000
Opening balance of Plan Asset	9,229	4,903
Expected benefit payments from Plan Asset	(25,196)	(25,543)
Additional contributions	31,530	35,473
Expected return on Plan Asset	3,098	3,081
Expected asset value as at end of year	**18,661**	**17,914**
Actuarial gains/(losses)	(789)	(8,685)
Closing balance of Plan Asset	**17,872**	**9,229**

Group

Pelchem:

We are not aware of any assets set aside for post-employment medical aid funding that qualify as Plan Assets in terms of the requirements of IAS19. As such we have ascribed a nil value to the fair value of Plan Assets.

NTP Radioisotopes:

NTP purchased an insurance policy in the form of a company owned annuity policy, which qualifies as a Plan Asset, effective as at 1 March 2011.

As at 31 March 2022, the policy value of the Plan Asset provided by the insurer was R21,642,304

The annuity portfolio is made up of a Growth Account and a Guaranteed Account. Increases are guaranteed at a minimum of CPI per annum. Funds are transferred from the Growth Account to the Guaranteed Account to fund the purchase of annuities for new retirees. The account may also be used to fund any increase in Employer Contributions in excess of the guaranteed annuities.

At the current and previous valuation date, the values of each of these accounts were as follows:

	31 March 2022 R'000	31 March 2021 R'000
Guaranteed account	15,083	13,448
Growth account	6,559	6,873
Market value of Plan Asset	**21,642**	**20,321**

	Group		Company	
	2022	2021	2022	2021
	R '000	R '000	R '000	R '000

17. Retirement benefits (continued)

IAS 19 requires Plan Assets to be accounted for at fair value. To ensure comparability and consistency between the asset and liability valuation, the fair value of the Guaranteed Account was calculated as the present value of the liabilities with increases at CPI using current valuation assumptions. The fair value of the Growth Account remains at market value (this was limited to the value of accrued liability as this also funds future service liabilities).

The fair value of the Plan Asset is therefore set as follows:

	31 March 2022 R'000	31 March 2021 R'000
Fair value of Plan Assets	19,036	19,328

The table below shows the reconciliation of the Plan Assets from opening to closing balance:

Reconciliation of Plan Assets	31 March 2022 R'000	31 March 2021 R'000
Opening balance of Plan Asset	19,328	15,828
Expected benefit payments from Plan Asset	(1,029)	(983)
Contribution from growth account for current service costs	260	199
Expected return on Plan Asset	2,069	1,917
Expected asset value as at end of year	**20,628**	**16,961**
Actuarial gains/(losses)	(1,592)	2,367
Closing balance of Plan Asset	**19,036**	**19,328**

18. DEFERRED INCOME

Government grants for future expenditure:

Non-current liabilities	635,860	608,634	635,860	608,634
Current liabilities	382,269	276,421	382,269	276,421
	1,018,129	**885,055**	**1,018,129**	**885,055**
At 1 April 2021	885,055	709,939	885,055	709,939
Received during the year	849,139	816,886	849,139	816,886
Released to the statement of comprehensive income	(716,065)	(663,830)	(716,065)	(663,830)
Other movements (Note 1)	-	22,060	-	22,060
At 31 March 2022	**1,018,129**	**885,055**	**1,018,129**	**885,055**

(Note 1) Other movements - represent the utilisation of other grants that were received in the previous year, but utilised in the current year. These other grants mainly from the government and relate to capital expenditures.

Refer to note 25, and 29 for nature and detail of the government grant received relating to decommissioning and decontamination costs.

19. PROVISIONS

Reconciliation of provisions - Group - 2022	Opening balance	Additions	Utilised during the year	Reversed during the year	Change in discount factor	Total
Decommissioning and waste disposal	805,114	66,331	(8,745)	(2,178)	1,914	862,436
Employee benefit accruals	133,380	9,359	(9,537)	(3,140)	-	130,062
	938,494	**75,690**	**(18,282)**	**(5,318)**	**1,914**	**992,498**

Reconciliation of provisions - Group - 2021	Opening balance	Additions	Utilised during the year	Reversed during the year	Change in discount factor	Total
Decommissioning and waste disposal	592,661	268,414	(29,334)	(28,278)	1,651	805,114
Employee benefit accruals	76,074	83,468	(26,162)	-	-	133,380
	668,735	**351,882**	**(55,496)**	**(28,278)**	**1,651**	**938,494**

Reconciliation of provisions - Company - 2022	Opening balance	Additions	Utilised during the year	Total
Decommissioning and waste disposal	685,459	51,997	-	737,456
Employee benefit accruals	86,313	(5,913)	(4,535)	75,865
	771,772	**46,084**	**(4,535)**	**813,321**

Reconciliation of provisions - Company - 2021	Opening balance	Additions	Utilised during the year	Reversed during the year	Total
Decommissioning and waste disposal	502,932	267,236	(58,379)	(26,330)	685,459
Employee benefit accruals	51,485	37,013	(2,185)	-	86,313
	554,417	**304,249**	**(60,564)**	**(26,330)**	**771,772**

Non-current liabilities	862,436	805,114	737,456	685,459
Current liabilities	130,062	133,380	75,865	86,313
	992,498	**938,494**	**813,321**	**771,772**

Provision for decommissioning and waste disposal:

Provision is made for the decommissioning of purely commercial plants and disposal of the resulting waste. The annual transfer is based on the latest available cost information. The Company was awarded a license from the National Nuclear Regulator to transport the waste to Vaalputs on 15 March 2011. The assessment methodology provides an estimate of the total cost associated with the decommissioning of commercial plants currently existing at Necsa to the point where they can be reused or released from regulatory control, and the total cost to manage (treat, condition, store and/or dispose) all the existing and future waste created by these activities. In order to estimate the cost and scheduling of the various decommissioning and waste management activities the following assumptions were made:

19. Provisions (continued)

i) In view of the fact that the Necsa site will remain a licensed site for the foreseeable future, the decommissioning of facilities to the point of release from regulatory control is not necessarily regarded as the required endpoint, as that may depend on the potential future re-use of the nuclear facility.

ii) Only liabilities associated with existing facilities identified during the assessment cycle, and future facilities identified as essential for the discharge of these liabilities are included in the assessment.

iii) The following costs are included in the assessment:

The cost to decommission all facilities to the point where they can be released from regulatory control (The cost exclude future demolishing cost of buildings). Rehabilitation of the site was not included in the assessment, except in cases where this was considered to be the most viable option to achieve release from regulatory control.

A potential benefit (cost decrease) may be achieved as a result of technological progress in the fields of decommissioning and waste management. There are, however, many uncertainties that may impact the accuracy of cost estimates for discharging nuclear liabilities, mainly due to the long time periods over which the cost estimates must be done. Some of these uncertainties are listed below:

Non-technical aspects, such as socio-political factors and changes in laws or regulations in nuclear safety and waste management, are difficult to quantify in terms of impact on cost estimates.

Decommissioning cost for many projects occur some years in the future. The lifetime of some processes may also be extended resulting in the postponement of decommissioning activities and cost.

Future developments in the nuclear industry (up scaling or down scaling) may result in the reuse of contaminated or previously decommissioned facilities. Refer note 25 and 29 for further disclosure on the nature of Decommissioning and Decontaminating liability.

Accrual for employee benefits:

The leave days is a provision, because there is uncertainty over the timing and amount at year end and it is still included as a provision and in our understanding it is a provision as defined. This sentence has now been updated to reflect this.

General:

It is envisaged that, based on the current information available, any additional liability in excess of the amounts provided will not have a material adverse effect on the Group's financial position, liquidity or cash flow.

The impact of COVID-19 was taken into account when determining the fair value of provisions There was no impact on the fair value of provisions due to the COVID-19 pandemic.

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

20. TRADE AND OTHER PAYABLES

Financial instruments:				
Trade payables	112,542	108,384	40,459	15,577
Funds held on behalf of NRWDI	34	34	-	-
Accrued expenses	51,422	32,745	38,342	38,377
Payroll accruals	14,224	16,599	8,144	8,053
Deposits received	97	-	-	-
Other payables	53,428	53,650	50,132	44,500
Non-financial instruments:				
Amounts received in advance	8,053	13,416	-	-
VAT	10,494	15,297	9,571	14,873
	250,294	**240,125**	**146,648**	**121,380**

Fair value of trade and other payables

The carrying amounts of trade and other payables are considered to be the same as their fair values, due to their short-term nature.

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

The average credit period on purchases is between 30 and 60 days from date of statement. The Company and Group settle payments to creditors on average 30 days from receipt of the statements. The Company and Group has financial risk management policies in place to ensure that all payables are paid within the credit timeframe.

The impact of COVID-19 was taken into account when determining the fair value of trade payables. There was no impact on the fair value of trade payables due to the COVID-19 pandemic.

Included in Other payables are sundry creditors and other miscellaneous items, of which outstanding cheque deposits form a big part of the total.

21. REVALUATION RESERVE

The revaluation reserve consists of fair value adjustments to the land and buildings of the Company and Group.

Fair value adjustment to land and buildings	757,737	726,795	746,614	715,969

Necsa does not intend to sell its land and buildings before decommissioning and decontamination takes place. An exercise will need to be conducted to check the decommissioning and decontamination of the land and buildings. Refer to note 31 on further disclosure on the revaluation reserve.

22. GOODWILL

Group	2022			2021		
	Cost	Accumulated impairment	Carrying value	Cost	Accumulated impairment	Carrying value
Goodwill	16,585	-	16,585	16,584	-	16,584

Reconciliation of goodwill - Group

	Goodwill
Cost	
At 01 April 2020	16,584
At 31 March 2021	**16,584**
At 31 March 2022	**16,584**
Carrying amount	
Cost	16,584
At 31 March 2021	**16,584**
Cost	16,585
At 31 March 2022	**16,585**

Goodwill

Goodwill was recognised on the acquisition of the following subsidiaries:

1) AEC-Amersham SOC Ltd

Percentage of voting equity interests acquired: 100% Description of how the NECSA obtained control of AEC-Amersham: NECSA obtained control of AEC-Amersham through its 100% voting equity interest in NTP Radioisotopes, which in turn obtained 100% voting equity interests in AEC-Amersham. Factors that make up the goodwill recognised: Synergies are expected from combining operations of AEC-Amersham with the NECSA group of companies.

2) Gammatec NDT Supplies SOC Ltd

Percentage of voting equity interests acquired: 55% Description of how the NECSA obtained control of Gammatec NDT Supplies: NECSA obtained control of Gammatec NDT Supplies through its 100% voting equity interest in NTP Radioisotopes, which in turn obtained 55% voting equity interests in Gammatec NDT Supplies. Factors that make up the goodwill recognised: Synergies are expected from combining operations of Gammatec NDT Supplies with the NECSA group of companies.

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

22. Goodwill (continued)

Goodwill Allocation				
AEC-Amersham SOC Ltd	5,227	5,227	-	-
Gammatec NDT Supplies SOC Ltd	11,357	11,357	-	-
	16,584	**16,584**	**-**	**-**

23. FINANCIAL ASSETS AT AMORTISED COST

Retention fees receivables	576,053	457,781	576,053	457,781
Split between non-current and current portions				
Current assets	576,053	457,781	576,053	457,781

Ringfenced, 3rd party funds and other short-term investments are investments that are ringfenced and must be used for a specific purpose, or are held on behalf of 3rd parties. These are all investments linked to various bank accounts and no expected credit losses can therefore apply as the values cannot decrease due to economic factors.

Retention fees receivable relates to contracts with clients where an amount is withheld until the quality conditions of the contracts have been fulfilled. The fair value approximates the carrying value.

24. DERIVATIVES

Non-hedging derivatives				
Revaluation of open forward exchange contracts	2,748	2,149	-	-
Forex exchange contract	(805)	(10,895)	(805)	(10,895)
	1,943	**(8,746)**	**(805)**	**(10,895)**
Split between non-current and current portions				
Current assets	2,748	2,149	-	-
Current liabilities	(805)	(10,895)	(805)	(10,895)
	1,943	**(8,746)**	**(805)**	**(10,895)**

Refer to note 47 Fair value information for details of valuation policies and processes.

Refer to note 46 Financial instruments and risk management further details.

25. DECOMMISSIONING AND DECONTAMINATION OF STAGE 1

The South African Nuclear Energy Corporation Ltd (Necsa) has been established for the Republic in terms of the Nuclear Energy Act 46 of 1999 to manage and operate the Republic's nuclear and related objectives. Necsa derives its mandate (powers and functions) solely from the Act and the Minister of Energy via the Department of Minerals Resources and Energy (DMRE), and is subjected to the Policies and Procedures designed by the DMRE.

25. Decommissioning and Decontamination of Stage 1 (continued)

The National Nuclear Regulator (NNR), an organ of the State, was established in terms of the National Nuclear Regulator Act 47 of 1999. Section 1 (xiv) of the NNR Act makes provision for the granting of nuclear authorisations, also known as Nuclear Installations Licenses (NILs). Section 20 (1) of the Act states that "No person may site, construct, operate, decontaminate or decommission a nuclear installation, except under the authority of a Nuclear Installation Licence"'

Section 21 (1) requires that any person wishing to site, construct, operate, decontaminate or decommission a nuclear installation may apply in the prescribed format to the Chief Executive Officer of the NNR for a nuclear installation licence and must furnish such information as the NNR Board of Directors requires. Necsa is currently the license holder of forty one (41) Nuclear Installation Licenses (NILs) that was issued by the NNR. The NNR approved NILs issued to Necsa, govern all nuclear activities undertaken in the disused and operational nuclear facilities.

The Republic of South Africa announced its intention to abandon the Nuclear Weapons Programme in 1989 and acceded to the NonProliferation of Nuclear Weapons on 10 July 1991. Stemming from this announcement Necsa started in 1995 with the shutdown of the various strategic nuclear facilities directly linked to the Nuclear Weapons Programme while the other strategically related operating nuclear facilities were excluded to continue the maintenance of the Necsa site license and to support some of the current operating facilities to date.

These shutdown facilities (some have been Decommissioned & Decontaminated (D&D) while others are scheduled to be Decommissioned & Decontaminated) are currently known as pastdisused strategic nuclear facilities. All the other ancillary nuclear facilities that were strategically used for the Nuclear Weapons Programme have been kept operational for the new NonWeapons (peaceful application of nuclear energy) mandate and are currently known as the Past Operational Strategic Nuclear facilities.

In terms of Section 55 (2) read with Section 1 (xiia) of the Nuclear Energy Act, 1999 (Act No. 46 of 1999), the D&D of Past Strategic Nuclear facilities, including the management of related radioactive material and waste, is an institutional nuclear obligation that vests in the Minister of Mineral Resources and Energy. Necsa is responsible for discharging of the liabilities and government is responsible for funding thereof.

In 2000 Necsa was requested by the then DMRE to quantify the total nuclear and related liability at the Pelindaba site arising from the nuclear weapons/strategic programme. Necsa then submitted to Cabinet, in April 2004, through the DMRE, a Nuclear Liabilities Management Plan (NLMP). The NLMP differentiated between three stages of D&D, namely:

- Stage 1 Decommissioning and Decontamination of all disused historical nuclear facilities.
- Stage 2 Decommissioning and Decontamination of all remaining (currently operating as at 2004) nuclear facilities.

In November 2005 Cabinet approved funding of approximately R1,8 billion (2004/05 Rand values) as reflected below: The D&D of disused historical nuclear facilities (Stage 1) of the Nuclear Liabilities Management Plan (R1,5 billion) and Decommissioning and remediation of Thabana waste trenches & waste storage facilities, which were excluded from the NLMP, R270 million.

25. Decommissioning and Decontamination of Stage 1 (continued)

In order to provide a monitoring mechanism for effective oversight of the implementation of the approved 2005 Cabinet resolutions, DMRE issued a Policy Procedure on the Management of Nuclear Liabilities arising from Past Strategic Nuclear Facilities in May 2008, the latest policy procedure was issued in April 2021. According to the policy procedure, Necsa must submit to DMRE a formal reassessment of the liabilities every five years or at a shorter frequency if so required by the Minister. The initial methodology for reassessing the liabilities and any changes to the methodology thereafter must be agreed with the DMRE prior to implementation.

The reassessment takes in account the following and is subjected to international experts benchmarking and validation:

a) Review of variables and values used in the assessment model (e.g. interest rates, inflation rates, waste inventories, processing cost, etc.)

b) Review assumptions made in the model.

c) Appropriateness of model used.

d) Adjustments due to liabilities discharged in previous years.

The assessed amount is adjusted for inflation annually until the next reassessment. Since 2007/08 NECSA has been receiving annually ringfenced grants from the State to discharge this liability on behalf of the DMRE.

Stage1 Liabilities In 2013/14 financial year, all the parties considered that the Decommissioning and Decontamination liability vested in the Minister and was recognised in the financial statements of the DMRE; and NECSA was acting as an agent of the Minister with regard to D&D. A Senior Counsel opinion, obtained in March 2016, confirmed that the liability to Decommission and Decontaminate past strategic nuclear facilities rests with NECSA with regard to both disused and currently in use facilities; and that the State is obligated to fund these liabilities.

The Minister has accepted this opinion and has transferred this liability as well as Cabinet's approval to fund the Stage 1 liability to NECSA; to be recognised in NECSA's financial statements as from the 2014/15 financial year.

An independent international expert, Crossland Consulting Ltd, has confirmed that the assessment methodology used to determine the liability was in line with international best practice and that the amount was sound and reasonable.

After adjusting for inflation and the costs already incurred this liability has been determined to be R3.4 billion as at 31 March 2021 and in terms of IAS 37 this liability is recognised as a provision (liability) and the State's funding obligation, approved by Cabinet is recognised as an asset.

The initial 2018/19 liability reassessment that was conducted by Necsa was not accepted by the 2019 independent review team (Crosland Consulting) for the following reasons:

1. Concern that the methodology assumed end date of 2033 is not realistic and attainable.

2. No justification/detailed long term plan to substantiate the remaining years of the 2033 end date.

3. Indirect/overhead cost not sufficient (was less than 2013/14 +CPI). This approach was based on the 2013/14 methodology as agreed to base 2018/19 assessment.

4. Queries in the facility inventory and D&D assessments.

25. Decommissioning and Decontamination of Stage 1 (continued)

The above, required corrective measures to be implemented, another 2018/19 reassessment conducted and reviewed by the 2020 independent review team, The R5.5 Billion current prices was confirmed/accepted as a reasonable estimates compared to the previously assessed R3.6 Billion that was rejected by the review team. The reason for the increase was mainly due to the following:

- The high level long term plans for Waste Management and Decommissioning activities that were developed, after being identified as a shortcoming by the independent expert reviewer from the previous reassessment that was not accepted by the independent review team.
- These long term plans pushed the projects from 2033 to 2040 increasing the project end date by seven (7) years.
- The negative impact of the underfunding over the past years that delayed the execution of the projects also contributed to this estimate although additional funding was provided in 2018.

An independent international expert, Crossland Consulting Ltd, has confirmed that the 2020 assessment methodology used to determine the liability provides a reasonable central estimate of the ongoing liability, as such it provides a reasonable figure for the purpose of securing government funding

	Group		Company	
	2022	2021	2022	2021
	R '000	R '000	R '000	R '000
Non-current assets				
Decommissioning & decontamination - Stage 1	4,762,140	4,597,130	4,762,140	4,597,130
Non-current liabilities				
Decommissioning & decontamination - Stage 1	(4,762,140)	(4,597,130)	(4,762,140)	(4,597,130)
	-	-	-	-
Government grant income (Decommissioning & decontamination - Stage 1 & 2)	(129,578)	84,063	(129,578)	84,063
Acceptance of Decommissioning & decontamination - Stage 1 & 2	129,578	(84,063)	129,578	(84,063)
	-	-	-	-

2022	Opening R'000	Finance Charge / Finance Income R'000	Change in discount factor R'000	Total R'000
Assets	4,597,130	312,897	(147,887)	4,762,140
Liabilities	(4,597,130)	(312,897)	147,887	(4,762,140)
	-	-	-	-

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

25. Decommissioning and Decontamination of Stage 1 (continued)

2021	Opening R'000	Finance Charge / Finance Income R'000	Change in discount factor R'000	Total R'000
Assets	4,236,762	312,706	47,663	4,597,130
Liabilities	(4,236,762)	(312,706)	(47,663)	(4,597,130)
	-	-	-	-

Stage 2 Liabilities

The Stage 2 facilities are currently in operation and these facilities will only be Decommissioned and Decontaminated once operations cease.

Strategic Operational Nuclear Facilities currently in use:

During 2013/14, the D&D Stage 2 liability assessment by management was calculated at R478 million. The formal assessment of liability is done periodically. In between the formal assessment, applicable economic indicators such as inflation are utilized to calculate the liability.

The Stage 2 Liability has been assessed on the basis of the same methodology as for Stage 1. The reassessment is conducted every five (5) years and the assessed amount will be adjusted for inflation until the next reassessment. The last assessment was conducted in 2015/2016 financial year. An independent international expert, Crossland Consulting Ltd, has confirmed that the assessment methodology used to determine the liability was in line with international best practice and that the amount of R512 million was sound and reasonable as on 30 March 2017.

Up to 2017/18, the asset could only be recognised to the extent of the allocation letter of grant for the Medium Term Expenditure Framework (MTEF) period received from the shareholder Department of energy. However, in June 2018, the Minister of Finance through the Cabinet Memo 04 of 2018 accepted the funding obligation for Stage 2. To this extent, the Stage 2 liability matches the asset with effect from 2018/19 financial year. To address the incongruity between liabilities exceeding the asset with regard to D&D Stage 2, Necsa through the Department of Minerals Resources and Energy (DMRE) drafted a Cabinet Memorandum 04 of 2018 requesting the Cabinet to approve in writing the funding commitment of Stage 2 liability for Operational Nuclear Facilities at Necsa.

To this extent, the cabinet approved the funding of Stage 2 and requested the DMRE and National Treasury to finalize the matter in such a way that the AGSA will be satisfied that the funding obligation of Stage 2 lies with the state. Therefore, with effect from 2018/19 the Cabinet memo read with the Minister of Finance's letter complies with IAS37.

Non-current assets				
Decommissioning & decontamination - Stage 2	193,753	160,321	193,753	160,321
Non-current liabilities				
Decommissioning & decontamination - Stage 2	(193,753)	(160,321)	(193,753)	(160,321)
	-	-	-	-

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

25. Decommissioning and Decontamination of Stage 1 (continued)

2022	Opening R'000	Finance Charge / Finance Income R'000	Change in discount factor R'000	Total R'000
Assets	160,321	15,122	18,310	193,753
Liabilities	(160,321)	(15,122)	(18,310)	(193,753)
	-	-	-	-

2021	Opening R'000	Finance Charge / Finance Income R'000	Change in discount factor R'000	Total R'000
Assets	121,680	2,241	36,399	160,321
Liabilities	(121,680)	(2,241)	(36,399)	(160,321)
	-	-	-	-

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

26. VAALPUTS AFTER CARE

Non-current Asset	22,845	23,582	22,845	23,582
Non-current liabilities	(52,821)	(48,999)	(52,821)	(48,999)
	(29,976)	**(25,417)**	**(29,976)**	**(25,417)**

2022	Opening R'000	Depreciation	Change in discount factor R'000	Total R'000
Vaalputs After Care Non-current asset	23,581	(737)	-	22,845
Vaalputs After Care non-current liabilities	(48,999)	-	(3,822)	(52,821)
	(25,418)	**(737)**	**(3,822)**	**(29,976)**

2021	Opening R'000	Depreciation	Change in discount factor R'000	Total R'000
Vaalputs After Care Non-current asset	24,318	(737)	-	23,582
Vaalputs After Care non-current liabilities	(46,592)	-	(2,407)	(48,999)
	(22,274)	**(737)**	**(2,407)**	**(25,417)**

26. Vaalputs After Care (continued)

Vaalputs institutional control

In terms of Section 50 of the Nuclear Energy Act, the responsibility for the Republic's institutional nuclear obligations vests in the Minister of Mineral Resources and Energy. The management of nuclear waste disposal on a national basis is one of these obligations as defined in Section 1(xii) of the Act.

The management of radioactive waste disposal on a national basis is assigned to the National Radioactive Waste Disposal Institute. The Institute is an independent entity established by statute under the provision of section 55(2) of the Nuclear Energy Act to fulfil the institutional obligation of the Minister of Mineral Resources and Energy. Although the institute was established through the statutes and that Board of Directors were appointed, it is still not fully operational.

In terms of section 30(8) of the Disposal Institute Act, DMRE subsequently appointed Necsa on 7 March 2010 to maintain the Nuclear. Installation License for Vaalputs (NIL28) until such time as the NRWDI is in a position to take over these functions to the satisfaction of the NNR. To date the NNR still did not issue NRWDI with the Nuclear Installation License.

Vaalputs is required to make provision in a Long Term Provision fund to cover the costs which will be incurred during the institutional control period of Vaalputs. This is a period of total 300 years after closure of the disposal site, and also called Aftercare. Contributions to this fund should be made to the fund during the operational period of Vaalputs (currently foreseen until 2054), thus ensuring that sufficient funds are available by the start of the institutional control period for these 300 years.

Provision was made for this fund and annually contributions were made. A methodology and model was developed and documented by Necsa to determine and assess on an annual basis the total required provision which would be required by Vaalputs closure in current terms. This model also compares the determined required provision with the current total provision/asset, and then also determines the annual contributions required for the remainder of the operational period of Vaalputs.

The model considers all the projected operational expenses during the control period, investment return, inflation, site closure date,etc. The model is run each year to reassess and compare the actual investment performance with the then projected current required provision, and the required annual fund contribution. The statement above reflects the current actual provision/investment as noncurrent Asset, and the model determined required current provision as noncurrent liabilities. The difference will be addressed by the modeldetermined further annual contributions which will be made until site closure.

27. FINANCIAL ASSETS MEASURED AT FAIR VALUE THROUGH OTHER COMPREHENSIVE INCOME RESERVE

The fair value through other comprehensive income reserve comprises all fair value adjustments on financial instruments designated as financial assets measured at fair value through other comprehensive income . When an asset or liability is derecognised, the fair value adjustment relating to that asset or liability is transferred to retained earnings/accumulated loss.

Financial assets measured at fair value through other comprehensive income	496	332	496	332

	Group		Company	
	2022	2021	2022	2021
	R '000	R '000	R '000	R '000

28. BORROWINGS

Held at amortised cost				
Secured				
Standard Bank - Installment sale agreements	-	453	-	-
The loans are repaid in monthly instalments over a period of 5 years and is subject to interest linked to prime.				
First National Bank - Mortgage	-	1,590	-	-
This loan is secured by a first mortgage bond registered over land and buildings Portion 91 of Farm 601, Klipplaatdrif, Vereeniging (Note 4). Interest is charged at prime rate minus 1%. The bond is repayable in equal monthly installments of R150, 008 over 120 months.				
	-	**2,043**	**-**	**-**
Split between non-current and current portions				
Current liabilities	-	2,043	-	-

29. INVESTMENT CONTRIBUTIONS FOR FUTURE LIABILITIES

This represents contributions invested / ring fenced for the future decommissioning of facilities.

	2020	Additions	2021	Additions	2022
	R'000	R'000	R'000	R'000	R'000
NTP - Decommissioning and Decontamination of buildings exclusively utilised	23,879	701	24,580	1,269	25,850
NTP Contribution to the Decommissioning and Decontamination of the Reactor / Safari-1	22,051	12,118	34,169	2,289	36,457
	45,930	**12,819**	**58,749**	**3,558**	**62,307**

The Stage 2 facilities include the SAFARI-1 Reactor which NTP Radioisotopes SOC Ltd (NTP), a subsidiary of Necsa, is contracted to manage and operate. In terms of the manage and operate agreement NTP and Necsa will share the Decommissioning and Decontamination costs of SAFARI-1; and NTP will be charged based on the commercial utilisation of the SAFARI-1 by NTP. NTP's contribution is ring-fenced and invested to be utilised when Decommissioning and Decontamination commences. Refer to note 25 for further information on Decommissioning and Decontamination costs.

2022	Opening	Additions	Total
	R'000	R'000	R'000
NTP - Decommissioning and Decontamination of buildings exclusively utilised	(24,580)	(1,269)	(25,849)
NTP Contribution to the Decommissioning and Decontamination of the Reactor / Safari-1	(34,169)	(2,289)	(36,458)
	(58,749)	**(3,558)**	**(62,307)**

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

29. Investment contributions for future liabilities (continued)

2021	Opening R'000	Additions R'000	Total R'000
NTP - Decommissioning and Decontamination of buildings exclusively utilised	(23,879)	(701)	(24,580)
NTP Contribution to the Decommissioning and Decontamination of the Reactor / Safari-1	(22,051)	(12,118)	(34,169)
	(45,930)	**(12,819)**	**(58,749)**

30. REVENUE

Revenue from contracts with customers				
Sale of goods	1,386,860	972,582	396,800	363,511
Rendering of services	(58,274)	8,500	-	-
Government grants	715,455	663,830	715,455	663,830
Other grants	20,094	25,890	20,095	25,890
	2,064,135	**1,670,802**	**1,132,350**	**1,053,231**

Disaggregation of revenue from contracts with customers

The group disaggregates revenue from customers as follows:

Sale of goods				
Sale of goods	1,386,860	972,582	396,800	363,511
Rendering of services				
Other revenue from rendering of services	(58,274)	8,500	-	-
Grants				
Government grants	715,455	663,830	715,455	663,830
Other grants	20,094	25,890	20,095	25,890
	735,549	**689,720**	**735,550**	**689,720**
The amount included in revenue arising from government grants is as follows:				
Operating activities	539,874	521,768	539,874	521,768
Decommissioning of strategic plants	185,127	150,586	185,128	150,586
LEU Fuel and conversion	-	6,390	-	6,390
Security	10,548	10,976	10,548	10,976
	735,549	**689,720**	**735,550**	**689,720**

The government grant relating to operating activities is primarily utilised to fund research and development expenses, non-commercial overheads and supplementary activities as required by the Nuclear Energy Act, costs for discarding radioactive waste and for storage of irradiated nuclear fuel.

	Group		Company	
	2022	2021	2022	2021
	R '000	R '000	R '000	R '000

30. Revenue (continued)

The South African Government has an obligation to discharge nuclear liabilities resulting from the previous strategic nuclear programme which includes decommissioning and decontamination of disused historic facilities. The Minister of Department of Minerals, Resource and Energy is charged with this responsibility on behalf of government. A Nuclear Liabilities Management Plan (NLMP) was approved by cabinet in February 2007.

Necsa, as a statutory body created in terms of the Nuclear Energy Act (Act 46 of 1999) has been delegated with certain responsibilities in this regard. It annually receives funds to apply to the decommissioning and decontamination process in terms of the NLMP. Funds received by Necsa for this purpose and not utilised at year end are accounted for as deferred grants.

31. COST OF SALES

Sale of goods	741,412	396,555	221,711	180,159
Rendering of services	2,594	2,361	-	-
Contracts with customers	43,202	2,287	43,202	2,287
Manufactured goods:				
Raw materials consumed	248	-	248	-
Employee costs	172,335	169,346	-	-
Depreciation and impairment	14,613	14,051	-	-
Manufacturing expenses	(2,801)	(2,196)	-	-
	971,603	**582,404**	**265,161**	**182,446**

32. OTHER OPERATING INCOME

Administration and management fees received	82	106	-	-
Commissions received	57	56	57	56
Royalties received	24,378	14,931	-	-
Other recoveries	5,298	4,941	-	-
Scrapping income	10,204	10	10,192	10
Other income	4,340	22,390	11,130	10,978
	44,359	**42,434**	**21,379**	**11,044**

		Group		Company	
		2022	2021	2022	2021
	Note(s)	R '000	R '000	R '000	R '000

33. OPERATING LOSS

Operating loss for the year is stated after charging (crediting) the following, amongst others:

low value asset and short term lease payments					
Fleet transport		2,654	2,443	2,654	2,443
Equipment		1,296	2,241	1,296	2,241
Buildings		49,093	49,087	49,093	49,087
Miscelaneous		444	211	444	211
Auditor's remuneration - external					
Audit fees		15,902	7,885	8,222	(1,773)
Auditor's remuneration - internal		**1,835**	**1,378**	**-**	**-**
Other					
Employee costs		1,106,580	1,150,738	733,193	780,257
Consulting and professional fees		20,340	35,156	9,563	18,163
Impairment of inventory included in cost of merchandise	11	(5,996)	6,819	(6,024)	(5,493)
Employee costs included in cost of merchandise	31	(172,454)	(137,501)	-	-
Remuneration costs other than to employees		2,472	2,512	-	-
Defined contribution plan	17	1,300	1,174	-	-
Research and development costs		800	109	-	-
Amortisation on Intangible assets	5	1,012	1,286	1,012	1,286
Movement in trade and other receivables	12	(340)	(765)	-	-
Impairment of property, plant and equipment	4	7,803	4,715	-	-
Depreciation and amortisation					
Depreciation of property, plant and equipment	4	89,912	88,837	70,634	74,338
Depreciation of right-of-use assets	16	2,013	3,497	1,669	3,058
Amortisation of intangible assets	5	4,457	6,579	101	1,286
Total depreciation and amortisation		**96,382**	**98,913**	**72,404**	**78,682**
Less: Depreciation included in cost of merchandise sold and inventories		(18,777)	(18,399)	-	-
Total depreciation and amortisation expensed		**77,605**	**80,514**	**72,404**	**78,682**

	Group		Company	
	2022	2021	2022	2021
	R '000	R '000	R '000	R '000

34. INVESTMENT INCOME

Dividend income				
Equity instruments at fair value through profit or loss:				
Unlisted investments - Local	1,352	574	11,773	-
Equity instruments at fair value through other comprehensive income:				
Listed investments - Local	-	383	-	383
Total dividend income	**1,352**	**957**	**11,773**	**383**
Interest income				
Investments in financial assets:				
Bank and other cash	39,727	42,360	31,863	33,516
Interest charged ontrade and other receivables	187	464	-	343
Fair value adjustments	2,309	590	-	-
Stage 1 decommissioning and	328,020	314,947	328,020	314,947
Local listed investment income	3,497	710	-	-
Total interest income	**373,740**	**359,071**	**359,883**	**348,806**
Total investment income	**375,092**	**360,028**	**371,656**	**349,189**

35. FINANCE COSTS

Group loans	-	-	-	1,993
Non-current borrowings	658	144	457	122
Interest on Trade and other payables	21	65	-	5
Bank overdraft	7,396	3,940	2,015	-
Interest on lease liabilities	461	526	364	323
Finance cost on D&D provisions	328,020	314,947	328,020	314,947
Fair value adjustments (1)	110	(3,263)	-	-
Total finance costs	**336,666**	**316,359**	**330,856**	**317,390**

Necsa did not capitalise borrowing costs in the current or prior year presented.

(1) Fair value adjustments relate to imputed interest.

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

36. OTHER NON-OPERATING GAINS (LOSSES)

Fair value gains (losses				
Investment property	4,843	19,124	4,843	19,124

37. TAXATION

Major components of the tax expense (income)				
Current				
Local income tax - current period	5,308	4,357	-	-
Deferred				
Originating and reversing temporary differences	651	(10,432)	-	-
Arising from previously unrecognised tax loss / tax credit / temporary differences	19,087	15,885	-	-
Rate change to 27%	(19)	-	-	-
Deferred tax prior year	-	(762)	-	-
	19,719	**4,691**	-	-
	25,027	**9,048**	**-**	**-**
Reconciliation of the tax expense				
Reconciliation between accounting profit and tax expense				
Accounting loss	(46,253)	(398,826)	(102,780)	(291,965)
Tax at the applicable tax rate of 28% (2021: 28%)	(12,951)	111,671	-	-
Tax effect of adjustments on taxable income				
Permanent differences	45	102	-	-
Permanent differences: Learnership	(136)	(91)	-	-
Capital Gains Tax	-	(64)	-	-
Non-taxable income	(159)	(160)	-	-
Non-deductible impairements	-	602	-	-
Non-deductible expenses	(23)	25	-	-
Differences due to Group transactions	(13,294)	46,905	-	-
Non-taxable dividends	(622)	(345)	-	-
Research and development allowance	(941)	(606)	-	-
Intellectual property amortisation	794	1,524	-	-
Consulting fees	130	191	-	-
Legal fees	55	44	-	-
Depreciation on site improvements	109	106	-	-
Deferred tax prior year	(471)	(602)	-	-
Under/(Over) provision of tax in prior year	51	(62)	-	-
Rate change	4,845	-	-	-
Other income	(283)	1,533	-	-
Income from Equity accounted investments	(737)	(589)	-	-
Wear and tear timing differences	517	(432)	-	-
Tax losses	19,320	17,199	-	-

	Group		Company	
	2022	2021	2022	2021
	R '000	R '000	R '000	R '000

37. Taxation (continued)

Permanent differences: Holding company exempt from tax	28,778	55,439	-	-
	25,027	**9,048**	**-**	**-**

The South African Revenue Services has coapproved an exemption in respect of The South African Nuclear Energy Corporation SOC Limited under section 10(1)(cA)(i) of the Income Tax Act. No provision is therefore made for tax for Necsa Company.

38. OTHER COMPREHENSIVE INCOME

Components of other comprehensive income - Group - 2022	Gross	Tax	Net before non-controlling interest	Non-controlling interest	Net
Items that will not be reclassified to profit (loss)					
Remeasurements on net defined benefit liability/ asset					
Remeasurements on net defined benefit liability/as	14,664	-	14,664	-	14,664
Movements on revaluation					
Gains (losses) on property revaluation	30,942	-	30,942	-	30,942
Movements on valuation of net defined benefit obligation					
Gains on valuation	2,849	(543)	2,306	-	2,306
Total items that will not be reclassified to profit (loss)	**48,455**	**(543)**	**47,912**	**-**	**47,912**
Items that may be reclassified to profit (loss)					
Exchange differences on translating foreign operations					
Exchange differences arising during the year	-	-	-	(20)	(20)
Gains (losses) on hedge of net investment in foreign operations					
Gains (losses) on hedge	65	-	65	-	65
Financial assets measured at fair value through other comprehensive income adjustments					
Gains (losses) on valuation	164	-	164	-	164
Total items that may be reclassified to profit (loss)	**229**	**-**	**229**	**(20)**	**209**
Total	**48,684**	**(543)**	**48,141**	**(20)**	**48,121**

38. Other comprehensive income (continued)

Components of other comprehensive income - Group - 2021			
	Gross	Tax	Net
Items that will not be reclassified to profit (loss)			
Remeasurements on net defined benefit liability/asset			
Remeasurements on net defined benefit liability/as	(21,959)	-	(21,959)
Movements on revaluation			
Gains (losses) on property revaluation	113,495	-	113,495
Movements on valuation of net defined benefit obligation			
Gains (losses) on valuation	(3,634)	1,532	(2,102)
Total items that will not be reclassified to profit (loss)	**87,902**	**1,532**	**89,434**
Items that may be reclassified to profit (loss)			
Exchange differences on translating foreign operations			
Exchange differences arising during the year	(373)	-	(373)
Financial assets measured at fair value through other comprehensive income adjustments			
Gains (losses) on valuation	141	-	141
Total items that may be reclassified to profit (loss)	**(232)**	**-**	**(232)**
Total	**87,670**	**1,532**	**89,202**

Components of other comprehensive income - Company - 2022			
	Gross	Tax	Net
Items that will not be reclassified to profit (loss)			
Remeasurements on net defined benefit liability/asset			
Remeasurements on net defined benefit liability/as	14,676	-	14,676
Movements on revaluation			
Gains (losses) on property revaluation	30,645	-	30,645
Total items that will not be reclassified to profit (loss)	**45,321**	**-**	**45,321**
Items that may be reclassified to profit (loss)			
Financial assets measured at fair value through other comprehensive income adjustments			
Gains (losses) on valuation	164	-	164
Total	**45,485**	**-**	**45,485**

38. Other comprehensive income (continued)

Components of other comprehensive income - Company - 2021	Gross	Tax	Net
Items that will not be reclassified to profit (loss)			
Remeasurements on net defined benefit liability/asset			
Remeasurements on net defined benefit liability/as	(21,791)	-	(21,791)
Movements on revaluation			
Gains (losses) on property revaluation	113,404	-	113,404
Total items that will not be reclassified to profit (loss)	**91,613**	**-**	**91,613**
Items that may be reclassified to profit (loss)			
Financial assets measured at fair value through other comprehensive income adjustments			
Gains (losses) on valuation	(56)	-	(56)
Total	**91,557**	**-**	**91,557**

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

39. CASH GENERATED FROM/(USED IN) OPERATIONS

Loss for the year	(71,340)	(407,940)	(102,780)	(291,965)
Adjustments for:				
Fair value adjustment on financial assets	(4,843)	(19,736)	(4,843)	(19,124)
Depreciation and amortisation	112,794	100,914	73,316	78,681
(Profit)/loss on sale of assets	-	-	-	26
Movemen in retirement benefit asset	(7,333)	(1,648)	(8,643)	-
Income from equity accounted investments	(1,673)	(1,837)	-	-
Government Grant Income (Decommissioning and Decontamination Stage 1)	129,578	(84,063)	129,578	(84,063)
Acceptance of Decommissioning and Decontamination Stage 1	(129,578)	84,063	(129,578)	84,063
Interest income relating to Stage 1 decommissioning and decontamination	(328,020)	(201,399)	(328,020)	(201,399)
Interest expensed (D&D related)	328,020	201,399	328,020	201,399
Total Decommissioning and decontamination asset and liability movements	4,559	3,143	4,559	3,143
Lease liabilityinterest expense	87	203	364	323
Decrease in retirement benefit obligation	-	-	-	(4,326)
Movement in provisions	54,005	269,759	41,550	217,355
Deferred tax expense	19,719	4,692	-	-
Movement in deferred tax	(1,180)	(435)	-	-
Movement in current tax payable / receivable	(906)	2,994	-	-
Interest income	(45,720)	(44,327)	(31,863)	(33,859)
Interest expense	8,559	1,412	2,472	2,120
Dividend Income	(1,352)	(957)	(11,773)	(383)

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

39. Cash generated from/(used in) operations (continued)

Changes in working capital:				
Movements in inventories	44,159	314	2,316	11,668
Movements in trade and other receivables	69,782	(29,885)	70,075	(116,666)
Movements in pre-payments	(4,423)	(54,774)	(12,200)	(46,268)
Movement in trade and other payables	10,166	23,007	25,267	(14,912)
Amounts received in advance	(72,568)	103,362	(12,267)	72,322
	112,492	**(51,739)**	**35,550**	**(141,865)**

40. TAX (PAID) REFUNDED

Balance at beginning of the year	9,923	12,917	-	-
Current tax for the year recognised in profit or loss	(5,287)	(4,357)	-	-
Balance at end of the year	(10,829)	(9,923)	-	-
	(6,193)	**(1,363)**	**-**	**-**

41. COMMITMENTS

Authorised capital expenditure

Already contracted for but not provided for				
○ Property, plant and equipment	16,246	8,188	16,114	5,739
○ Open purchase orders	55,673	27,957	-	-

This committed expenditure relates to plant and equipment and will be financed through ordinary trading operations.

From 1 January 2019, the group has recognised right-of-use assets for these leases, except for short-term and low-value leases, see note 16 for further information relating to commitments in respect of lease liabilities.

42. CONTINGENCIES

By their nature, contingencies will only be resolved when one or more future events occur or fail to occur. The assessment of such contingencies inherently involve the exercise of significant judgement and estimates of the outcome of future events.

Litigation and other judicial proceedings as a rule raise difficult and complex legal issues and are subject to uncertainties and complexities including, but not limited to, the facts and circumstances of each particular case, issues regarding the jurisdiction in which each suit is brought and differences in applicable law. Upon resolution of any pending legal matter, the Company may be forced to incur charges in excess of the presently established provisions and related insurance coverage. It is possible that the financial position, results of operations or cash flows of the Company could be materially affected by the unfavourable outcome of litigation.

42. Contingencies (continued)

No	Matter Name	Matter Description	Amount Claimed	Status
1.	Sin Pro	Claim for damages	Service provider claiming R18 041 912.30 including interest for unlawful termination.	NECSA has a counter claim exceeding the amount claimed by the plaintiff.
2.	Jan Van Rensburg	Claim for damages	The amount claimed R 48 794 000.00 including interest for injuries incurred.	Former employee got injured at work. He instituted a claim against Necsa for damages suffered. Necsa is disputing the claim on the basis that the employee should rather submit a claim against the Workman Compensation Fund.
3.	Lapa La Africa	Claim for damages	Amount claimed is R 7 813 500.00 Including interest being amount for remainder of contract.	Necsa offered R200†000.00 for services already rendered but this was rejected. Approaching the court to review and set contract aside.
4.	Jan/Maria Voster v Necsa	Claims for monies owed by Necsa in respect of services rendered	Outstanding amount owed are R149 040.00 for Cornelia Vorster and R 359 920.00 for Jan. Plaintiffs' were employed as Independent Contractors and their contracts were terminated as Necsa no longer required their services.	On 28 September 2020, Necsa was served with Summons. On 22 October 2020, our attorneys of record were served with notice for application of summary judgement. Necsa filed the notice of intention to oppose both matters. Awaiting the notice of set down.
5.	NEHAWU obo Mdlungu Buyiswa v NECSA	Claim for unfair conduct relating to promotion/ demotion/ probation/ training or benefits. After not qualifying for pay progression as per managers score, the employee declared a dispute.	Amount claimed is R 12 309.72	On the last appearance the Applicant was requested to apply for condonation as her matter was referred outside the stipulated time frame for referral.
6.	NEHAWU obo Ngwenya, Doctor and 1 other v NECSA	Claim for unfair dismissal after employees expected their fixed term contracts to be renewed on expiry.	Amount claimed is R 97 747.72	The matter was a part heard and after the 2021 Collective Bargaining process, an agreement was signed where all the cases at the CCMA relating the non-renewal of the fixed term contract will be subjected to a criteria wherein qualifying employees will be absorbed. Subsequently one applicant was absorbed and the other the CCMA made a ruling that he was both a student and an employee. The CCMA will reschedule the matter for arbitration.
7.	NEHAWU obo Natasha Banda, Priscilla Kgabo and Osacar Mtileng v NECSA	Claim for unfair dismissal after employees expected their fixed term contracts to be renewed on expiry.	Amount claimed is R 400 680.00	The matter was referred back for the parties to consider if the applicants will not qualify as per the resolution of the collective agreement. The applicants withdrew the dispute on that basis. However when the Applicants did not qualify, and approach the CCMA to reopen the matter, the CCMA indicated that they do not have jurisdiction and a new application with a condonation should be lodged.

42. Contingencies (continued)

Legal claims:

Possible quantifiable legal obligations exist for the Group totalling an estimated R20 609 000 (2021: R19 831 000) in connection with disputes with delivery of goods, arrear rentals receivable, unfair labour practice, CCMA disputes and services rendered. These cases are currently being investigated by the Necsa Legal division.

Guarantees:

Guarantees of R 2,068 (2021: R1,868) were issued by Nedbank on behalf of NTP Logistics SOC Limited in favour of suppliers.

Suretyship:

A limited deed of suretyship for an amount of up to R20 000 000 (2021: R20 000 000) has been given to Pelchem SOC Limited for a Nedbank facility. R14 000 000 (2021: R14 000 000) relates to an overnight facility and R6 000 000(2021: R6 000 000) to an asset based finance.

NTP Radioisotopes SOC Limited

In May 2018, NTP Radioisotopes SOC Limited, a 100% owned subsidiary of Necsa, signed a R30 million guarantee in favour of the IDC for a loan granted to Pelchem SOC Limited, on condition that the current letter of support issued to Pelchem be withdrawn. Pelchem is a 100% owned subsidiary of Necsa SOC Limited. On 25 May 2018 the Board of NTP Radioisotopes SOC Limited approved a guarantee of R 20 million in favour of Nedbank for the overdraft granted to Pelchem SOC Limited. The letter of support and the approval for issuing of both guarantees expired.

43. RELATED PARTIES

Relationships

Holding entity	Department of Mineral Resources and Energy
Subsidiaries	Refer to note 6
Associates	Refer to note 7
National government	All national government departments are regarded to be related parties in accordance with circular 4 of 2005: Guidance on the term ìState controlled entitiesî in the context of IAS 24 - Related Parties, issued by the South African Institute of Chartered Accountants. No transactions are implied simply by the nature of existence of the relationship between entities. All directors have given general declarations of interest in terms of the Companies Act.
Directors and members of key management	Details of directors and key management remuneration paid are disclosed in note 44

	Group		Company	
	2022	2021	2022	2021
	R '000	R '000	R '000	R '000

43. Related parties (continued)

The following is a summary of transactions with related parties during the year and balances due at year end

National public entities				
Services rendered	2,364	1,592	2,364	1,592
Services received	5,718	54,945	57,198	54,945
Trade amount due (to)/ from	92	423	92	423
National Government Departments				
Services rendered	852,056	840,131	852,056	840,131
Trade amount due (to)/from	4,892	34,538	4,892	34,538
Expected credit loss	(1,538)	(1,538)	(1,538)	(1,538)
Net trade amount due (to)/from	**3,354**	**33,000**	**3,354**	**33,000**
Loan accounts owing / (to)				
NTP Radioisotopes SOC Ltd	-	-	(38,377)	(47,537)
Pelchem SOC Ltd	-	-	(2,106)	(1,522)
NTP Radioisotopes SOC Ltd	-	-	-	(47)
Trade and Other Receivables				
NTP Radioisotopes SOC Ltd	-	-	53,534	73,272
AEC-Amersham SOC Ltd	-	-	92	37
Gammatec NDT Supplies Ltd	-	-	197	334
NTP Logistics SOC Ltd	-	-	32	45
Pelchem SOC Ltd	-	-	298,353	254,496
Trade and Other Payables				
NTP Radioisotopes SOC Ltd	-	-	(9)	(304)
AEC-Amersham SOC Ltd	-	-	(7)	(2)
NTP Logistics SOC Ltd	-	-	(841)	(10,368)
Interest paid / (received)				
NTP Radioisotopes SOC Ltd	-	-	(1,918)	1,993
Purchases				
NTP Radioisotopes SOC Ltd	-	-	319	500
AEC-Amersham SOC Ltd	-	-	106	2
Gammatec NDT Supplies SOC Ltd	-	-	4	24
NTP Logistics SOC Ltd	-	-	2,225	1,433
Pelchem SOC Ltd	-	-	66	206
Sales				
NTP Radioisotopes Ltd	-	-	(301,022)	(371,079)
AEC-Amersham SOC Ltd	-	-	(554)	(661)
Gammatec NDT Supplies SOC Ltd	-	-	(911)	(1,309)
NTP Logistics SOC Ltd	-	-	(673)	(776)
Pelchem SOC Ltd	-	-	(38,791)	(38,542)
Electricity Deposits				
NTP Radioisotopes Ltd	-	-	904	-
Compensation to directors and other key management				
Short-term employee benefits	71,133	71,425	32,140	32,765

43. Related parties (continued)

Trade amount due to/from subsidiaries are gross values reflected prior to provisions for bad debts.

A provision for bad debts relating to Pelchem was raised R 298.3 million (2021: R254.5 million).

Trade debtor, Gammatec, has payment terms of 60 days. Pelchem trade debtors have payment terms of 120 days. The remaining accounts have payment terms of 30 days.

44. DIRECTORS' AND PRESCRIBED OFFICER'S EMOLUMENTS

Group Executives						
2022						
	Taxable allowance	Leave gratuity	Retirement fund contributions	Other company contribution	Salary	Total
	R'000	R'000	R'000	R'000	R'000	R'000
Ms MA Rasweswe	266	124	222	22	1,161	1,795
Mr TJ Tselane	516	-	290	28	1,497	2,331
Ms HNB Khumalo	-	289	375	28	1,719	2,411
Mr MA Mondi	343	-	315	27	1,537	2,222
Mr MU Ramatsui	387	265	217	24	1,123	2,016
Mr ZA Ismail	319	-	112	18	746	1,195
Ms NF Tengimfene	352	-	198	22	1,021	1,593
Mr UKRD Natha	613	-	140	21	686	1,460
Dr JR Zeevaart	13	-	315	27	1,885	2,240
Mr JF du Bruyn	-	-	275	25	1,679	1,979
Ms N Matube	341	-	187	21	981	1,530
Mr FM Mkhabela	625	-	172	22	801	1,620
Mr AB Myoli	496	-	278	728	1,440	2,241
Ms PF Hawadi	365	-	-	94	413	872
Ms QM Boyede	274	-	-	59	249	582
Dr P Rampersadh	7	-	-	31	146	184
Miss SEN Rikhotso	127	-	-	64	278	469
	5,044	**678**	**3,096**	**560**	**17,362**	**26,740**

44. Directors' and prescribed officer's emoluments (continued)

2021	Taxable allowance	Leave gratuity	Retirement fund contributions	Other company contribution	Salary	Separation package	Total
	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Ms MA Rasweswe	477	-	292	21	1,429	-	2,219
Mr TJ Tselane	693	-	312	23	1,508	-	2,536
Ms HNB Khumalo	189	-	446	22	1,878	-	2,535
Mr MA Mondi	331	-	297	19	1,466	-	2,113
Mr MU Ramatsui	635	-	286	21	1,382	-	2,324
Mr ZA Ismail	540	-	107	15	507	-	1,169
Ms NF Tengimfene	433	-	195	17	942	-	1,587
Mr UKRD Natha	729	-	150	17	691	-	1,587
Mr A Chinake	388	-	185	16	913	-	1,502
Dr JR Zeevaart	388	-	312	21	1,538	-	2,259
Mr JF du Bruyn	115	-	273	17	1,212	-	1,617
Ms N Matube	368	-	185	16	899	-	1,468
Mr GP Tshelane	-	195	-	-	-	2,596	2,791
Mr FM Mkhabela	620	-	166	17	780	-	1,583
	5,906	**195**	**3,206**	**242**	**15,145**	**2,596**	**27,290**

Executive Director					
2022	Taxable allowance	Retirement Fund Contribution	Other company contributions	Salary	Total
	R'000	R'000	R'000	R'000	R'000
Mr L Tyabashe	1,254	346	38	1,700	3,338
2021	Taxable Allowance	Retirement fund contribution	Other company contributions	Salary	Total
	R'000	R'000	R'000	R'000	R'000
Mr L Tyabashe	314	86	9	400	809
Mr AB Myoli	920	256	22	1,239	2,437
	1,234	**342**	**31**	**1,639**	**3,246**

44. Directors' and prescribed officer's emoluments (continued)

Non executive directors				
2022				
	Directors' fees	Reimbursive travel allowance	Company contributions	Total
	R'000	R'000	R'000	R'000
Adv A Chowan	255	1	3	259
Dr GJ Davids	200	-	2	202
Mr MJ Maboa	153	-	2	155
Dr NT Magau	219	-	3	222
Ms SKN Masango	250	-	3	253
Mr DR Nicholls	282	4	3	289
Mr LJ Shayi	226	19	3	248
Ms LN Tungamirai	207	1	2	210
	1,792	**25**	**21**	**1,838**

2021				
	Directors' fees	Company contributions	Other fees	Total
	R'000	R'000	R'000	R'000
Adv A Chowan	282	3	1	286
Dr GJ Davids	255	3	-	258
Mr MJ Maboa	216	3	-	219
Dr NT Magau	247	3	-	250
Ms SKN Masango	322	3	-	325
Mr DR Nicholls	301	3	11	315
Mr LJ Shayi	290	3	18	311
Ms L Noge-Tungamirai	262	3	-	265
	2,175	**24**	**30**	**2,229**

The following directors did not receive any emoluments:

Ms PE Monale

Ms BM Makgopa

Amb NN Ntshinga

Mr M van Schalkwyk

Details of service contracts

No director has a notice period in excess of one year and no director's contract makes provision for predetermined compensation on termination exceeding one year's salary and benefits in kind. No directors are proposed for election or re-election at the forthcoming annual general meeting. All the directors have a service contract.

45. PRIOR PERIOD ERRORS

The following prior period errors were corrected in the current year AFS and the amounts of the corrections and the financial statement line items affected were as follows:

Group

2021

	Reason codes	Previously reported	Adjustment	Restated
Statement of Financial Position				
Assets				
Non-Current Assets				
Property Plant and Equipment	2,10,34, 37	1,408,735	6,108	1,414,843
Right of use Assets	37	8,978	7,703	16,681
Intangible assets	38	21,108	670	21,778
Investments in associates		7,198	(434)	6,764
Retirement benefit asset	16,32	9,229	(977)	8,252
Deferred tax	14,16,28, 39	169,835	(43,127)	126,708
Decommissioning and Decontaminations of Stage 1	1	3,411,338	1,185,792	4,597,130
Decommissioning and Decontaminations of Stage 2	1	145,764	14,557	160,321
Current Assets				
Inventories	11,12,13,26	372,110	(7,511)	364,599
Trade and other receivables	4,7	378,928	(29,597)	349,331
Other financial assets	35	461,950	(4,169)	457,781
Derivates	35	-	2,149	2,149
Prepayments		57,439	(4)	57,435
Cash and cash equivalents	17	169,734	2,025	171,759
Equity and Liabilities				
Equity				
Reserves	8,30	739,256	(5,382)	733,874
Accumulated loss	4,5,6,9,10,11,31	(196,043)	(46,719)	(242,762)
Non-controlling interest	29	62,563	(361)	62,202
Liabilities				
Non Current Liabilities				
Vaalputs After Care	6	50,203	(1,204)	48,999
Leases and Right-of-use assets	30	2,646	(2,040)	606
Retirement benefit obligation	16,32	297,469	(19,328)	278,141
Deferred tax	1,16,18,28,39	49,298	(47,823)	1,474
Provisions	5,6,9,19,20,27	712,182	92,932	805,114
Decommissioning and Decontaminations of Stage 1	1	3,411,338	1,185,792	4,597,130
Decommissioning and Decontaminations of Stage 2	1	145,764	14,557	160,321

45. Prior period errors (continued)

	Reason codes	Previously reported	Adjustment	Restated
Current Liabilities				
Trade and other payables	4,7	259,281	(19,156)	240,125
Loan from shareholders		-	23	23
Borrowings	35	-	2,043	2,043
Derivatives	35	-	10,895	10,895
Other financial liabilities	35	12,944	(12,944)	-
Leases and Right-of-use assets		-	1,602	1,602
Retirement benefit obligation	16,32	25,205	18,351	43,556
Current tax payable	15	1,377	(422)	955
Provisions	5,6,9,19,20,27	133,957	(577)	133,380
Amounts received in advance	7	270,101	(9,309)	260,792
Bank overdraft	17	14,004	(28)	13,976
Statement of Profit or Loss and Other Comprehensive Income				
Revenue	3,4,24,25	1,675,835	(5,033)	1,670,802
Cost of sales	10,11,13,18	(576,217)	(6,187)	(582,404)
Other income	13,15,22,23,25	42,198	236	42,434
Expected credit loss trade receivables	26	30,674	(13,634)	17,040
Other operating expenses	2,7,18,21,22,33	(1,266,965)	(86,760)	(1,353,725)
Government Grant Income (Decommissioning&Decontamination Stage 1 & 2)	1, 9	352,013	(267,950)	84,063
Acceptance of Decommission and Decontamination Stage 1 & 2	1, 9	(352,013)	267,950	(84,063)
Administration and fees	36	(268,126)	10,256	(257,870)
Investment income	1,9,23	233,923	126,105	360,028
Finance costs	1,5,6,17	(192,968)	(123,391)	(316,359)
Income from equity accounted investments	28	2,539	(435)	2,104
Taxation	14,15,28	(11,890)	2,842	(9,048)
Remeasurements on net defined benefit liability/asset	41	(19,199)	(6,394)	(25,593)
Taxation	41	1,532	3,064	1,532

2021 Necsa Group - The prior period adjustments made were as follows:

1. The calculation of the D&D asset, liability, revenue and expenditure values were corrected in the current year and the values on the AFS were corrected.
2. PPE Acquisitions were incorrectly allocated to expenses in the past. This was corrected in the current year AFS.
3. Revenue was allocated to the incorrect revenue account and this was corrected in the current year AFS.
4. The allocation between receivables, payables and amounts received in advance was done incorrectly in the past and interest received and revenue was recognised incorrectly.

45. Prior period errors (continued)

5. The D&D provision calculation was not done correctly in the past. This was corrected in the current year AFS.
6. The provision for Vaalputs calculation was not done correctly in the past. This was corrected in the current year AFS.
7. Year end provisions were not reversed. This error was corrected in the current year AFS.
8. A revaluation of PPE accounting entry was passed incorrectly in the past. This was corrected in the current year.
9. The decommissioning and decontamination provision assessment performed in prior years has used incorrect methodology and assumed the incorrect discount rate for the unwinding of the provision. Consequently, provisions and the related expense had been understated for the 2021 financial years.
10. Property, plant and equipment has been shown impairment indicators and thus all property plant and equipment held by the company has been impaired for 2020 and 2021.
11. In 2020 management did not perform a costing on work in progress in terms of IAS 2, this was corrected in the current year.
12. Correction of provision for slow moving stock recognised as the balance processed did not agree to the supporting calculation.
13. Correction of inventory adjustment as the inventory listing did not agree to the accounting records due to a transaction being duplicated.
14. Correction of deferred taxation due to the impact of correcting prior period errors.
15. Correction of taxation due to the impact of correcting prior period errors.
16. Correction of fair value gains on the retirement benefit and investment held as well as tax on these gains have been incorrectly recognised in profit or loss instead of other comprehensive income in 2019, 2020 and 2021.
17. Correction of interest on bank overnight facility recognised. The balance recorded and the balance per the bank confirmation was different as the interest on overdraft was only recognised when actually paid instead of on an accrual basis of accounting. Therefore, there was an overstatement of interest as a result thereof.
18. Correction of incorrect reversals of accruals to cost of sales and operating expenses as there was no documentation to support the reversal.
19. Correction of leave pay provision as incorrect inputs have previously been used in the calculation. The leave pay provision balance has been corrected from 2019 financial year.
20. Correction of trade creditors provision as there was a difference identified between the provision calculation and the balance recorded.
21. Correction of an expense of corporate overheads relating to company secretarial services that has been classified as cost of sales instead of general expense.
22. Correction of accrued expenses incorrectly classified to income instead of expenses.

45. Prior period errors (continued)

23. Reclassification of investment income to other operating income, therefore overstating investment income and understating operating income.

24. Correction of overstatement of revenue in the 2020 year that relates to revenue earned in the 2019 year. This was corrected in the current year.

25. A sales transactions was incorrectly recognised in financial year ending 31 March 2021.

26. The expected credit loss provision for the ending 31 March 2021 was incorrectly calculated.

27. A provision for employee profit share was incorrectly calculated.

28. The elimination of the deferred tax impact of a lease and related ROU asset recognised, as well as impairment thereon; pertaining to an intercompany transaction was adjusted as a result of a prior period adjustment made by the subsidiary.

29. The non controlling interest was adjusted as a result of prior period error corrections passed by the subsidiaries.

30. Reclassification of comprehensive income items and reserves done as part of the consolidation process.

31. Cumulative retained earning impact of all other elimination journals.

32. The long term and short term disclosure was corrected in the current year.

33. Amended the entry passed for recognising the difference between consolidated net profit and movement in consolidated retained earnings as an expenditure item.

34. A difference between the asset register and the general ledger was corrected in the current year.

35. The newest CaseWare template was taken into use in the current year and financial assets and liabilities were reclassified in accordance with the standard classification types available on the CaseWare template.

36. The corrections made to other operating income also had an impact on administration and fees expenditure.

37. Reversal of overstated depreciation due to useful life not being reassessed.

38. Intangible assets which were previously incorrectly recognised as an expense was capitalised.

39. The deferred tax assets and liabilities were corrected, to reflect the net deferred tax assets and net deferred liabilities of subsidiaries as deferred tax assets and deferred tax liabilities, respectively

40. The provision for fuel element disposal was increased to the correct amount.

41. Difference due to the correction of drafting errors.

45. Prior period errors (continued)

2020

	Reason codes	Previously reported	Adjustment	Restated
Statement of Financial Position				
Assets				
Non-Current Assets				
PPE	4, 21	1,353,101	4,831	1,357,932
Right of use Assets.	21	10,367	7,703	18,070
Deferred tax	7,8,9,15,16, 22	171,520	43,980	127,540
Decommissioning and Decontaminations of Stage 1	1,3	2,901,145	1,335,617	4,236,762
Decommissioning and Decontaminations of Stage 2	1,3	114,132	7,548	121,680
Current Assets				
Inventories	6, 13	364,863	53	364,916
Trade and other receivables	2, 12	319,384	62	319,446
Other financial assets	19	337,338	(1,958)	335,380
Prepayments	0	2,400	261	2,661
Cash and cash equivalents	20	202,910	(38)	202,872
Equity and Liabilities				
Equity				
Reserves	9	624,675	(1,962)	622,713
Accumulated loss	4,5,6,9,10,11,18	143,767	21,735	165,502
Non-controlling interest	17	58,724	110	58,834
Liabilities				
Non-Current Liabilities				
Other financial liabilities	19	2,319	(156)	2,163
Deferred tax	22	45,375	(43,130)	2,245
Provisions	11	594,770	(2,109)	592,661
Decommissioning and Decontaminations of Stage 1	1	2,901,145	1,335,617	4,236,762
Decommissioning and Decontaminations of Stage 2	1	114,132	7,548	121,680
Current Liabilities				
Trade and other payables	2,10,11	224,850	(7,730)	217,120
Loan from shareholders	0	-	21	21
Borrowings	19	-	5,010	5,010
Derivatives	19	-	11,543	11,543
Other financial liabilities	19	14,234	(14,234)	-

45. Prior period errors (continued)

2020 Necsa Group - The prior period adjustments made were as follows:

1. The calculation of the D&D asset and liability values were corrected in the current year and the values on the AFS were corrected.
2. Imputed interest was incorrectly recorded in the past. This was corrected in the current year.
3. The decommissioning and decontamination provision assessment performed in prior years has used incorrect methodology and assumed the incorrect discount.
4. Property, plant and equipment has been shown impairment indicators and thus all property plant and equipment held by the company has been impaired for 2020 and 2021.
5. The leased building has shown impairment indicators as it forms part of the cash generating unit that has been impaired, the entire right of use asset has been impaired for 2020 and 2021.
6. In 2020 management did not perform a costing on work in progress in terms of IAS 2, the journal is to correct the valuation of inventory 2020 and 2021.
7. Correction of deferred taxation due to the impact of correcting prior period errors.
8. Correction of taxation due to the impact of correcting prior period errors.
9. Correction of fair value gains on the retirement benefit and investment held as well as tax on these gains which were incorrectly recognised in profit or loss instead of other comprehensive income in 2019, 2020 and 2021.
10. Correction of incorrect reversals of accruals to cost of sales and operating expenses as there was no documentation to support the reversal.
11. Correction of leave pay provision as incorrect inputs have previously been used in the calculation. The leave pay provision balance has been corrected from 2019 financial year.
12. Correction of overstatement of revenue in the 2020 year that relates to revenue earned in the 2019 year.
13. Correction of provision for slow moving stock recognised as the balance processed did not agree to the supporting calculation.
14. Reclassification of investment income to other operating income, therefore overstating investment income and understating operating income.
15. Correction of fair value gains on the retirement benefit incorrectly classified as tax expense in the statement other comprehensive income.
16. Elimination entry passed in consolidation to eliminate prior period error adjustments passed by subsidiaries on intercompany transactions, affecting deferred tax, lease liabilities and ROU assets, as well as related impairment thereon.
17. Correction of non controlling interest share in balance due to the impact of prior period error corrections made by subsidiaries.
18. Cumulative retained earning impact of all other elimination journals.

45. Prior period errors (continued)

19. The newest CaseWare template was taken into use in the current year and financial assets and liabilities were reclassified in accordance with the standard classification types available on the CaseWare template.

20. Correction of interest on bank overnight facility recognised. The balance recorded and the balance per the bank confirmation was different as the interest on overdraft was only recognised when actually paid instead of on an accrual basis of accounting. Therefore, there was an overstatement of interest as a result thereof.

21. Reversal of overstated depreciation due to useful life not being reassessed.

22. In the past all individual deferred tax asset and deferred tax liability balances of subsidiaries were included in the consolidated deferred tax asset and deferred tax liability balances, respectively. This was corrected retrospectively in the current year, by reclassifying the balances so that the net deferred tax asset and net deferred tax liability of each subsidiary are now included in the deferred tax asset balance and deferred tax liability balance, respectively.

Company

2021

	Reason codes	Previously reported	Adjustment	Restated
Statement of Financial Position				
Assets				
Non-Current Assets				
Property, plant and equipment	9, 12	1,094,235	8,823	1,103,058
Right-of-use assets	12	7,520	7,703	15,223
Intangible assets	13	689	671	1,360
Decommissioning and Decontamination of Stage 1	1	3,411,338	1,185,792	4,597,130
Decommissioning and Decontamination of Stage 2	1	145,764	14,557	160,321
Current Assets				
Inventories	2	53,494	30	53,524
Financial assets at amortised cost	11	457,781	(1,027)	456,754
Trade and other receivables	3,4,7	183,348	(7,051)	176,297
Prepayments		46,466	(4)	46,462
Equity				
Accumulated loss	10	(767,549)	(62,831)	(830,380)
Reserves	8	716,104	197	716,301
Non-Current Liabilities				
Vaalputs After Care		50,203	(1,204)	48,999
Leases and right of use assets		888	101	989
Provisions	14	591,489	93,970	685,459
Decommissioning and Decontamination of Stage 1	1	3,411,338	1,185,792	4,597,130
Decommissioning and Decontamination of Stage 2	1	145,764	14,557	160,321

45. Prior period errors (continued)

	Reason codes	Previously reported	Adjustment	Restated
Current Liabilities				
Trade and other payables	3,4,7	132,030	(10,650)	121,380
Payment received in advance	7	270,101	(9,309)	260,792
Leases and right of use assets		2,169	(102)	2,067
Statement of Profit or Loss and Other Comprehensive Income				
Revenue	3,4,7	1,050,791	2,440	1,053,231
Cost of sales	7	(182,565)	119	(182,446)
Other operating income	4,5,6	10,834	210	11,044
Other operating expenses	2,20,7,14	(1,022,277)	(93,500)	(1,115,777)
Government Grant Income (Decommissioning & Decontamination Stage 1 & 2)	1	352,013	(267,950)	84,063
Acceptance of Decommission and Decontamination Stage 1 & 2	1	(352,013)	267,950	(84,063)
Investment income	1	224,078	125,111	349,189
Finance costs	1,5,6	(193,460)	(123,930)	(317,390)
Fair value through other comprehensive income adjustments	11	141	(197)	(56)
Administration and fees	2,20,7, 14	(147,460)	10,068	(137,392)

2021 Necsa Standalone - The prior period adjustments made were as follows:

1. The calculation of the D&D asset, liability, revenue and expenditure values were corrected in the current year and the values on the AFS were corrected.
2. PPE Acquisitions were incorrectly allocated to expenses in the past. This was corrected in the current year AFS.
3. Revenue was allocated to the incorrect revenue account and this was corrected in the current year AFS.
4. The allocation between receivables, payables and amounts received in advance was done incorrectly in the past and interest received and revenue was recognised incorrectly.
5. The D&D provision calculation was not done incorrectly in the past. This was corrected in the current year AFS.
6. The provision for Vaalputs calculation was not done correctly in the past. This was corrected in the current year AFS.
7. Year end provisions were not reversed. This error was corrected in the current year AFS.
8. A revaluation of PPE accounting entry was passed incorrectly in the past. This was corrected in the current year.
9. A difference between the asset register and the general ledger was corrected in the current year.
10. Cumulative Retained earning impact of all other elimination journals.
11. The newest CaseWare template was taken into use in the current year and financial assets and liabilities were reclassified in accordance with the standard classification types available on the CaseWare template.
12. Reversal of overstated depreciation due to useful life not being reassessed.
13. Intangible assets which were previously incorrectly recognised as an expense was capitalised.
14. The provision for fuel element disposal was increased to the correct amount.

45. Prior period errors (continued)

2020

	Reason codes	Previously reported	Adjustment	Restated
Statement of Financial Position				
Assets				
Non-Current Assets				
Property Plant and Equipment	4	1,037,434	8,625	1,046,059
Right of use assets	4	9,357	7,703	17,060
Loan to group companies	3	84,709	(84,709)	-
Decommissioning and Decontamination of Stage 1	1	2,901,145	1,335,617	4,236,762
Decommissioning and Decontamination of Stage 2	1	114,132	7,548	121,680
Current Assets				
Loans to group companies	3	72	84,030	84,102
Trade and other receivables		59,634	1	59,635
Equity				
Accumulated loss	2	(533,275)	16,651	(516,624)
Liabilities				
Non-Current Liabilities				
Decommissioning and Decontamination of Stage 1	1	2,901,145	1,335,617	4,236,762
Decommissioning and Decontamination of Stage 2	1	114,132	7,548	121,680
Current Liabilities				
Trade and other payables	2	136,614	(322)	136,292
Loans from group companies	3	46,223	(679)	45,544

2020 Necsa Standalone - The prior period adjustments made were as follows:

1. The calculation of the D&D asset and liability values were corrected in the current year and the values on the AFS were corrected.
2. Imputed interest was incorrectly recorded in the past. This was corrected in the current year.
3. The long terms and short term disclosure was corrected in the current year.
4. Reversal of overstated depreciation due to useful life not being reassessed.

46. FINANCIAL INSTRUMENTS AND RISK MANAGEMENT

Categories of financial instruments

Categories of financial assets

Group - 2022						
	Note(s)	Fair value through other comprehensive income - equity instruments	Fair value through profit or loss	Amortised cost	Total	Fair value
Loans receivable	23	-	-	576,053	576,053	576,053
Investments at fair value	9	1,250	298,552	-	299,802	299,802
Derivatives non hedging	24	-	2,748	-	2,748	2,748
Trade and other receivables	12	-	-	257,535	257,535	257,535
Cash and cash equivalents	13	-	-	228,423	228,423	228,423
		1,250	**301,300**	**1,062,011**	**1,364,561**	**1,364,561**

Group - 2021						
	Note(s)	Fair value through other comprehensive income - equity instruments	Fair value through profit or loss	Amortised cost	Total	Fair value
Loans receivable	23	-	-	457,781	457,781	457,781
Investments at fair value	9	1,055	264,148	-	265,203	265,203
Derivatives non hedging	24	-	2,149	-	2,149	2,149
Trade and other receivables	12	-	-	319,553	319,553	319,553
Cash and cash equivalents	13	-	-	171,759	171,759	171,759
		1,055	**266,297**	**949,093**	**1,216,445**	**1,216,445**

Company - 2022						
	Note(s)	Fair value through other comprehensive income - equity instruments	Fair value through profit or loss	Amortised cost	Total	Fair value
Loans receivable	23	-	-	576,053	576,053	576,053
Investments at fair value	9	1,215	298,552	-	299,767	299,767
Trade and other receivables	12	-	-	106,222	106,222	106,222
Cash and cash equivalents	13	-	-	33,819	33,819	33,819
		1,215	**298,552**	**716,094**	**1,015,861**	**1,015,861**

46. Financial instruments and risk management (continued)

Company - 2021						
	Note(s)	Fair value through other comprehensive income - equity instruments	Fair value through profit or loss	Amortised cost	Total	Fair value
Loans receivable	23	-	-	457,781	457,781	457,781
Investments at fair value	9	1,026	264,148	-	265,174	265,174
Trade and other receivables	12	-	-	176,297	176,297	176,297
Cash and cash equivalents	13	-	-	21,151	21,151	21,151
		1,026	**264,148**	**655,229**	**920,403**	**920,403**

Group - 2022						
	Note(s)	Fair value through profit or loss - Held for trading	Amortised cost	Leases	Total	Fair value
Trade and other payables	20	-	231,746	-	231,746	231,746
Compound instruments		-	52,821	-	52,821	52,821
Derivatives - non-hedging	24	805	-	-	805	805
Finance lease obligations	16	-	-	4,304	4,304	4,304
Bank overdraft	13	-	14,007	-	14,007	14,007
		805	**298,574**	**4,304**	**303,683**	**303,683**

Group - 2021						
	Note(s)	Fair value through profit or loss - Held for trading	Amortised cost	Leases	Total	Fair value
Trade and other payables	20	-	211,411	-	211,411	211,411
Loans from shareholders		-	23	-	23	23
Borrowings	28	-	2,043	-	2,043	2,043
Compound instruments		-	48,999	-	48,999	48,999
Derivatives - non-hedging	24	10,895	-	-	10,895	10,895
Finance lease obligations	16	-	-	2,208	2,208	2,208
Bank overdraft	13	-	13,976	-	13,976	13,976
		10,895	**276,452**	**2,208**	**289,555**	**289,555**

46. Financial instruments and risk management (continued)

Company - 2022						
	Note(s)	Fair value through profit or loss - Held for trading	Amortised cost	Leases	Total	Fair value
Trade and other payables	20	-	137,076	-	137,076	137,076
Loans from group companies	8	-	40,483	-	40,483	40,483
Compound instruments		-	52,821	-	52,821	52,821
Derivatives - non-hedging	24	805	-	-	805	805
Finance lease obligations	16	-	-	3,487	3,487	3,487
		805	**230,380**	**3,487**	**234,672**	**234,672**

Company - 2021						
	Note(s)	Fair value through profit or loss - Held for trading	Amortised cost	Leases	Total	Fair value
Trade and other payables	20	-	106,506	-	106,506	106,506
Loans from group companies	8	-	49,106	-	49,106	49,106
Compound instruments		-	48,999	-	48,999	48,999
Derivatives - non-hedging	24	10,895	-	-	10,895	10,895
Finance lease obligations	16	-	-	3,056	3,056	3,056
		10,895	**204,611**	**3,056**	**218,562**	**218,562**

The carrying value approximates fair value.

Capital risk management

The group's objective when managing capital (which includes share capital, borrowings, working capital and cash and cash equivalents) is to maintain a flexible capital structure that reduces the cost of capital to an acceptable level of risk and to safeguard the group's ability to continue as a going concern while taking advantage of strategic opportunities in order to maximise stakeholder returns sustainably.

The group manages capital structure and makes adjustments to it in light of changes in economic conditions and the risk characteristics of the underlying assets. In order to maintain the capital structure, the group may adjust the amount of dividends paid to the shareholder, return capital to the shareholder, repurchase shares currently issued, issue new shares, issue new debt, issue new debt to replace existing debt with different characteristics and/or sell assets to reduce debt.

		Group		Company	
		2022	2021	2022	2021
	Note(s)	R '000	R '000	R '000	R '000

46. Financial instruments and risk management (continued)

Compound instruments		52,821	48,999	52,821	48,999
Loans from group companies	8	-	-	40,483	49,106
Loans from shareholders		-	23	-	-
Borrowings	28	-	2,043	-	-
Lease liabilities		4,304	2,208	3,487	3,056
Trade and other payables	20	231,746	211,411	137,076	106,506
Total borrowings		**288,871**	**264,684**	**233,867**	**207,667**
Cash and cash equivalents	13	(214,416)	(157,783)	(33,819)	(21,151)
Net borrowings		**74,455**	**106,901**	**200,048**	**186,516**
Equity		504,189	529,500	(169,175)	(111,876)
Gearing ratio		15%	20%	(118)%	(167)%

Financial risk management

Overview

The group is exposed to the following risks from its use of financial instruments:

- Credit risk;
- Liquidity risk; and
- Market risk (currency risk, interest rate risk and price risk).

The board has overall responsibility for the establishment and oversight of the group's risk management framework. The board has established the risk committee, which is responsible for developing and monitoring the group's risk management policies. The committee reports quarterly to the board on its activities.

The group's risk management policies are established to identify and analyse the risks faced by the group, to set appropriate risk limits and controls, and to monitor risks and adherence to limits. Risk management policies and systems are reviewed regularly to reflect changes in market conditions and the group's activities.

46. Financial instruments and risk management (continued)

Credit risk

Credit risk is the risk of financial loss to the group if a customer or counterparty to a financial instrument fails to meet its contractual obligations.

The maximum exposure to credit risk is presented in the table below:

Group		2022			2021		
		Gross carrying amount	Credit loss allowance	Amortised cost / fair value	Gross carrying amount	Credit loss allowance	Amortised cost / fair value
Loans receivable	23	576,053	-	576,053	457,781	-	457,781
Investments at fair value through profit or loss	9	(76)	-	(76)	273	-	273
Trade and other receivables	12	392,003	(112,454)	279,549	422,203	(72,872)	349,331
Cash and cash equivalents	13	228,423	-	228,423	171,759	-	171,759
		1,196,403	**(112,454)**	**1,083,949**	**1,052,016**	**(72,872)**	**979,144**

Company		2022			2021		
		Gross carrying amount	Credit loss allowance	Amortised cost / fair value	Gross carrying amount	Credit loss allowance	Amortised cost / fair value
Loans receivable	23	576,053	-	576,053	457,781	-	457,781
Investments at fair value through profit or loss	9	(76)	-	(76)	273	-	273
Trade and other receivables	12	435,785	(329,563)	106,222	439,137	(262,840)	176,297
Cash and cash equivalents	13	33,819	-	33,819	21,151	-	21,151
		1,045,581	**(329,563)**	**716,018**	**918,342**	**(262,840)**	**655,502**

Liquidity risk

The maturity profile of contractual cash flows of non-derivative financial liabilities, and financial assets held to mitigate the risk, are presented in the following table. The cash flows are undiscounted contractual amounts.

Group - 2022					
		Less than 1 year	1 to 2 years	Total	Carrying amount
Non-current liabilities					
Lease liabilities		-	3,022	3,022	2,752
Current liabilities					
Trade and other payables	20	231,746	-	231,746	231,746
Lease liabilities		1,899	-	1,899	1,552
Bank overdraft	13	14,007	-	14,007	14,007
		(247,652)	**(3,022)**	**(250,674)**	**(250,674)**

46. Financial instruments and risk management (continued)

Group - 2021					
		Less than 1 year	1 to 2 years	Total	Carrying amount
Non-current liabilities					
Lease liabilities		-	776	776	606
Current liabilities					
Trade and other payables		211,411	-	211,411	211,411
Borrowings	28	2,043	-	2,043	2,043
Lease liabilities		1,847	-	1,847	1,602
Bank overdraft	13	13,976	-	13,976	13,976
		(229,277)	**(776)**	**(230,053)**	**(229,638)**

Company - 2022					
		Less than 1 year	1 to 2 years	Total	Carrying amount
Non-current liabilities					
Lease liabilities		-	2,584	2,584	2,325
Current liabilities					
Trade and other payables		137,076	-	137,076	137,076
Lease liabilities		1,461	-	1,461	1,162
		(138,537)	**(2,584)**	**(141,121)**	**(140,563)**

Company - 2021					
		Less than 1 year	1 to 2 years	Total	Carrying amount
Non-current liabilities					
Lease liabilities		-	1,097	1,097	989
Current liabilities					
Trade and other payables	20	106,506	-	106,506	106,506
Lease liabilities		2,238	-	2,238	2,067
		(108,744)	**(1,097)**	**(109,841)**	**(109,562)**

		Group		Company	
		2022	2021	2022	2021
	Note(s)	R'000	R'000	R'000	R'000

46. Financial instruments and risk management (continued)

Foreign currency risk

The group is exposed to foreign currency risk as a result of certain transactions and borrowings which are denominated in foreign currencies. Exchange rate exposures are managed within approved policy parameters utilising foreign forward exchange contracts where necessary. The foreign currencies in which the group deals primarily are US Dollars, Euros and Yen.

Exposure in Rand

The net carrying amounts, in Rand, of the various exposures, are denominated in the following currencies. The amounts have been presented in Rand by converting the foreign currency amounts at the closing rate at the reporting date:

US Dollar exposure:					
Non-current assets:					
Investments at fair value	26	54,326	34,689	54,326	34,689
Current assets:					
Trade and other receivables	12	96,502	122,492	11,162	12,223
Cash and cash equivalents	13	18,603	337	-	-
Payments in advance		-	85	-	-
Current liabilities:					
Trade and other payables	20	(28,863)	(41,657)	(1,206)	(678)
Net US Dollar exposure		**140,568**	**115,946**	**64,282**	**46,234**
Euro exposure:					
Current assets:					
Trade and other receivables	12	44,659	39,934	(1,079)	(406)
Cash and cash equivalents	13	798	1,388	-	-
Interest receivable		3,472	3,723	-	-
Payment in advance		-	1	-	-
Current liabilities:					
Trade and other payables	20	(3,787)	(4,689)	-	(287)
Income received in advance		-	(57)	-	-
Net Euro exposure		**45,142**	**40,300**	**(1,079)**	**(693)**
GBP exposure:					
Current liabilities:					
Trade and other payables	20	(66)	(100)	(16)	-
CHF exposure:					

		Group		Company	
		2022	2021	2022	2021
	Note(s)	R '000	R '000	R '000	R '000

46. Financial instruments and risk management (continued)

Current assets:					
Trade and other receivables	12	8	-	8	-
Current liabilities:					
Trade and other payables	20	-	(82)	-	-
CHF exposure		**8**	**(82)**	**8**	**-**
AUD exposure:					
Current assets:					
Cash and cash equivalents	13	-	7	-	-
Current liabilities:					
Trade and other payables	20	(887)	(448)	-	-
AUD exposure		**(887)**	**(441)**	**-**	**-**
Other exposure:					
Current assets:					
Trade and other receivables		1,536	2,579	-	-
Current liabilities:					
Trade and other payables	20	(887)	(448)	-	-
Other exposure		**649**	**2,131**	**-**	**-**
Net exposure to foreign currency in Rand		**185,414**	**157,754**	**63,195**	**45,541**

Foreign currency sensitivity analysis

The following information presents the sensitivity of the group to an increase or decrease in the respective currencies it is exposed to. The sensitivity rate is the rate used when reporting foreign currency risk internally to key management personnel and represents management's assessment of the reasonably possible change in foreign exchange rates. The sensitivity analysis includes only outstanding foreign currency denominated amounts and adjusts their translation at the reporting date. No changes were made to the methods and assumptions used in the preparation of the sensitivity analysis compared to the previous reporting period.

46. Financial instruments and risk management (continued)

Group	2022	2022	2021	2021
Increase or decrease in rate	Increase	Decrease	Increase	Decrease
Impact on profit or loss:				
USD 10% increase or decrease impact on profit/Loss	14,057	(14,057)	11,595	(11,595)
EURO 10% increase or decrease impact on profit/Loss	4,514	(4,514)	4,030	(4,030)
GBP 10% increase or decrease impact on profit/Loss	(7)	7	(10)	10
CHF 10% increase or decrease impact on profit/Loss	1	(1)	(8)	8
AUD 10% increase or decrease impact on profit/Loss	(89)	89	(44)	44
OTHER 10% increase or decrease impact on profit/Loss	65	(65)	213	(213)
	18,541	**(18,541)**	**15,776**	**(15,776)**

Company	2022	2022	2021	2021
Increase or decrease in rate	Increase	Decrease	Increase	Decrease
Impact on profit or loss:				
USD 10% increase or decrease impact on profit/Loss	64,282	(64,282)	46,234	(46,234)
EURO 10% increase or decrease impact on profit/Loss	(1,079)	1,079	(693)	693
GBP 10% increase or decrease impact on profit/Loss	(16)	16	-	-
CHF 10% increase or decrease impact on profit/Loss	8	(8)	-	-
	63,195	**(63,195)**	**45,541**	**(45,541)**

Interest rate risk

Interest rate sensitivity analysis

The following sensitivity analysis has been prepared using a sensitivity rate which is used when reporting interest rate risk internally to key management personnel and represents management's assessment of the reasonably possible change in interest rates. All other variables remain constant. The sensitivity analysis includes only financial instruments exposed to interest rate risk which were recognised at the reporting date. No changes were made to the methods and assumptions used in the preparation of the sensitivity analysis compared to the previous reporting period.

Group	2022	2022	2021	2021
Increase or decrease in rate	Increase	Decrease	Increase	Decrease
Financial instruments:				
Impact of 2% increase or decrease in interest rate on interest income	914	(914)	882	(882)
Impact of 2% increase or decrease in interest rate on interest expense	(171)	171	(94)	94
	743	**(743)**	**788**	**(788)**
Other:				
Impact of 2% increase or decrease in interest rate on D&D related interest income	6,560	(6,560)	4,028	(4,028)
Impact of 2% increase or decrease in interest rate on D&D related interest expense	(6,560)	6,560	(4,028)	4,028
	-	-	-	-
Total impact on profit or loss and equity	**743**	**(743)**	**788**	**(788)**

46. Financial instruments and risk management (continued)

The Group policy with regards to financial assets, is to invest cash at floating rates of interest and to maintain cash reserves in short-term investments in order to maintain liquidity, while also achieving a satisfactory return for shareholders.

Company	2022	2022	2021	2021
Increase or decrease in rate	Increase	Decrease	Increase	Decrease
Financial instruments:				
Impact of 2% increase or decrease in interest rate on interest income	637	(637)	677	(677)
Impact of 2% increase or decrease in interest rate on interest expense	(57)	57	(49)	49
	580	**(580)**	**628**	**(628)**
Other:				
Impact of 2% increase or decrease in interest rate on D&D related interest income	6,560	(6,560)	4,028	(4,028)
Impact of 2% increase or decrease in interest rate on D&D related interest expense	(6,560)	6,560	(4,028)	4,028
	-	-	-	-
Total impact on profit or loss and equity	**580**	**(580)**	**628**	**(628)**

47. FAIR VALUE INFORMATION

Fair value hierarchy of financial assets at fair value through profit or loss

This note provides information about how the Group determines fair values of various financial assets and financial liabilities.

The table below analyses assets and liabilities carried at fair value. The different levels are defined as follows:

For financial assets recognised at fair value, disclosure is required of a fair value hierarchy which reflects the significance of the inputs used to make the measurements.

Level 1: Quoted unadjusted prices in active markets for identical assets or liabilities that the group can access at measurement date.

Level 2: Inputs other than quoted prices included in level 1 that are observable for the asset or liability either directly or indirectly.

Level 3: Unobservable inputs for the asset or liability.

47. Fair value information (continued)

Levels of fair value measurements

Level 1

Recurring fair value measurements

		Group		Company	
		2022	2021	2022	2021
		R'000	R'000	R'000	R'000
Assets	**Note(s)**				
Equity investments at fair value through other comprehensive income	9				
Listed shares		1,250	1,055	1,215	1,055
Unit trusts		298,628	263,875	298,628	263,875
Total equity investments at fair value through other comprehensive income		**299,878**	**264,930**	**299,843**	**264,930**

(1) The following classes of financial assets at fair value through profit or loss are measured to fair value using quoted market prices:

- Listed Shares
- Unit Trusts

Level 2

Recurring fair value measurements

Assets	**Note(s)**				
Non-hedging derivatives	24				
Revaluation of open forward exchange contracts		2,748	2,149	-	-
Forex exchange contract		(805)	(10,895)	(805)	(10,895)
Valued at the counterparty contract value at the reporting date.		-	-	-	-
Total non-hedging derivatives		**1,943**	**(8,746)**	**(805)**	**(10,895)**

Highest and best use

All of the assets' current use are the highest and best use.

	Group		Company	
	2022	2021	2022	2021
	R '000	R '000	R '000	R '000

48. GOING CONCERN

The annual financial statements have been prepared on the basis of accounting policies applicable to a going concern. This basis presumes that funds will be available to finance future operations and that the realisation of assets and settlement of liabilities, contingent obligations and commitments will occur in the ordinary course of business.

Despite the previous losses that Necsa have made historically there is a positive trajectory with reduced losses year on year end., the company has a track record of continuing in operation, wherein this resilience will continue into the foreseeable future. Section 12 of the Nuclear Energy Act supports the mandate of the company in support of the going concern. Furthermore, Necsa has the ability to pay its short-term obligations, which it will do through the initiatives documented including through working capital management, austerity measure implementation, increasing revenue streams and prioritization of cash generating projects to name a few.

Management is aware of the material uncertainties as a result of the historic losses and negative ratios, and has embarked on a recovery plan premised on a Necsa turnaround strategy to ensure continued sustainability. This strategy is premised in the main on cost efficiency and diligent cost saving initiatives underway within the organization as well as growth initiatives to increase revenue streams. Various projects have also been undertaken to remedy the financial situation including the rehabilitation of the balance sheet situation. All of the various initiatives including the strategic projects underway are closely tracked and monitored to ensure the effectiveness of the plans underway. The entity remains resilient with the current success and positive results of the initiatives underway evident in the forecasts to March 2023 and the current performance of the organization post the March 2022 year end. Necsa is appreciative of the continuing support from the Shareholder which in addition to the various initiatives underway is supportive of the Necsa going concern consideration.

49. PUBLIC FINANCE MANAGEMENT ACT

Fruitless and wasteful expenditure:				
Opening balance	7,077	6,992	173	156
Add irregular expenditure	110	89	103	21
Recoveries made	(201)	(4)	(113)	(4)
Written off to the statement of comprehensive income	(86)	-	(86)	-
Fruitless and wasteful expenditure unresolved	**6,900**	**7,077**	**77**	**173**

Fruitless & Wasteful Expenditure for Necsa stand alone Company:

- R21,000 new addition: Relates to salary-related overpayments as a result of resignations and/or terminations for various reasons and upon the calculation of leave due, it was discovered that the said employees actually owed Necsa for leave taken in excess of available days. In this regard, some of the former employees are currently paying back in instalments and others are still being pursued.
- The rest of the old amounts are being pursued either through legal processes and/or through repayment arrangements that have been made emanating from signed Acknowledgement of debts.

	Group		Company	
	2022	2021	2022	2021
	R'000	R'000	R'000	R'000

49. Public Finance Management Act (continued)

Fruitless and Wasteful Expenditure for Pelchem SOC Ltd:

- SARS penalties and interest - relates to the late payment of the PAYE Investigations into the late payment penalties were concluded and R88 062 was recovered from one of the employees as a result of negligence.
- Transportation cost - A futile trip that was arranged by Pelchem sales department to collect product from Pelchem while the product was not ready to dispatch. Sales department did not cancel the collection and the customer charged Pelchem transport cost. The incident is under investigation and consequence management will apply if any negligence occurred. The incident is under investigation and consequence management will apply if any negligence occurred.

Irregular expenditure:				
Opening	210,815	443,669	68,452	324,940
Prior period error (1)	-	(265,000)	-	(265,000)
Non-adherence to procurement process (2)	11,811	32,146	3,169	8,512
	222,626	**210,815**	**71,621**	**68,452**

Irregular Expenditure for Necsa stand alone Company:

Note 1: The Minister's approval to withdraw from the investment of the NTP Fuel Elements disposal funds as is required by the Nuclear Energy Act section 18(4), Nuclear Energy Act section 26 and section 27 of the Companies Act was obtained. The Company had obtained the permission to utilise these funds for operational expenditure from both the Board and the Minister.

Irregular Expenditure for Pelchem SOC Ltd:

The irregular expenditureoccurred as a result of the following:

1) Procuring essential goods and services without having valid contracts in place. The services and goods exceed R1 million and in terms of the PFMA Pelchem is required to go out on tender for these services and goods. The tender is with the minister for approval. The company suffered no loss as a three quotation procurement process is followed while approval from the minister is pending.

2) Relates to repairs and maintenance done on surface fluoronation trolleys. A three quotation procurement as per policy was not followed. No loss occurred to the company as the repairs was necessary. The employee left the company before this irregular expenditure was discovered.

49. Public Finance Management Act (continued)

Irregular Expenditure for AEC Amersham SOC Ltd:

The findings of the Auditor are within the guidelines of the PFMA. The Company did not obtain multiple quotes or verify supplier certificates as required by the Procurement Act and in compliance with the PFMA. The process followed by management on procurement has had no adverse effect on the company.

Fruitless and Wasteful expenditure of R61,530.52 is confirmed. This amount comprises R55,136 in penalties and R6,395 in interest paid to SARS due to a late VAT payment. The disciplinary process is under way.

Fruitless and Wasteful expenditure of R60,338.15 is under investigation. This amount comprises R60,338.15 in penalties paid to SARS due to a late EMP submission.

Criminal or disciplinary steps: There were no material losses through criminal conduct or unauthorised expenditure. Therefore criminal or disciplinary steps are not applicable

Gifts, donations or sponsorships received: Employees are allowed to receive gifts and courtesies. Gifts and courtesies received above R300 are approved and recorded in a register. Gifts and courtesies received above R3,000 needs written permission from the CEO as appropriate.

Remissions or payments made as an act of grace: There were no remissions or payments made as an act of grace.

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