NNR Annual Report 2003/4



Annual Report Submitted to the Minister of Minerals and Energy on the health and safety of workers, the public and the environment associated with nuclear authorised sites in accordance with section 7(1) (j) of the National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) and the financial aspects in accordance with section 55 of the Public Finance Management Act, 1999 (Act No. 1 of 1999).

Vision

To be recognised internationally as a leading nuclear regulator

Mission

To provide an effective and efficient national regulatory framework for the protection of persons, property and environment against nuclear damage, through:

Excellence in nuclear regulatory practices, and

Human resources and transformation practices best suited to the nuclear regulatory needs of the nation.

RP 113/2004
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The Structure of the Regulator

THE BOARD OF DIRECTORS

The Regulator is controlled and governed in accordance with the NNR Act by the Board of Directors.

THE CHIEF EXECUTIVE OFFICER

The Chief Executive Officer is the accounting officer of the Board and has the responsibility to ensure that the functions of the Regulator are performed in accordance with the NNR Act and PFMA.

THE STAFF OF THE REGULATOR

The NNR's organisational structure consists of the following core groups:

a) **Power Reactor Division**

The division has two departments, namely:

- Koeberg Nuclear Power Station Programme
- Pebble Bed Modular Reactor Programme

b) **Nuclear Technology and Natural Sources Division**

The division has two departments, namely:

- Regulation of Natural Sources Programme
- Nuclear Technology and Waste Projects Programme

c) **Assessment Group**

The technical assessment functions previously performed by the Reactor Assessment Department and the Scientific and Technical Assessment Department have been grouped together in one Assessment Group. The Assessment Group renders technical assessment services to all the divisions.

d) **Regulatory Strategy Development Division**

The division comprises the following specialist services:

- Developmental Work in Standards and Regulatory Practices
- Legal services
- Communications and liaison
- Board Secretariat

e) **Corporate Support Services**

The division has two departments, covering the following functions:

- Human Resources and Administration
- Finance, Information Technology and Information Services

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The Board



PROF K BHARUTH-RAM

Prof Bharuth-Ram, the Chairperson of the NNR Board, holds a doctorate in nuclear physics from the University of Oxford and is Professor in the School of Physics, University of Natal. His official research standing is in the category of "researchers who enjoy considerable international recognition as independent researchers of high quality". His current research activity is mainly focused on applications of radioactive ion beams in materials research, in collaboration with colleagues at universities in Germany, Denmark, the UK and Portugal. He has been published in more than 120 scientific journals, made more than 100 contributions to international conferences, presented invited papers at five international conferences, is a member of nine international and seven national conference committees, and is a member of numerous research, academic and sporting (cricket) committees and associations.



MS L B ZONDO

Ms Zondo, the Chief Executive Officer of the NNR, obtained a B.Proc degree at the University of the North, LLB at the University of Natal, Durban and LLM Public Law at the London School of Economics. She practised as an advocate at the Johannesburg and Durban Bars. Prior to taking up her current position, she served as Secretary of the Preparatory Commission for the Comprehensive Nuclear Test Ban Treaty Organisation, in Vienna, Austria.



MR G M ABOOBAKER

Mr Aboobaker, Chief Director: Economic Sector, Policy Co-ordination and Advisory Services in the Office of the Presidency, joined the Office of the Presidency in 1995 as Director: Cabinet Research. He has been responsible for numerous studies (e.g. into poverty and inequality in South Africa), special projects and the organisation of top-level summits. He holds a BSc. (Mathematics and Physics) and BSc. Hons Cum Laude from the University of Durban-Westville and MSc (Economics of SA), SOAS, University of London. His studies included a course in theoretical nuclear physics at Unisa. In 1979 he registered with the then Atomic Energy Board and SA Medical and Dental Council, and worked with radionuclides and X-rays for diagnostic and therapeutic use. He has held tutorial and lecturing posts in medical facilities in Durban and served as a physicist in Cape Town (Groote Schuur).



DR J M STEWART

Dr Stewart, an independent engineering consultant, represents organised business on the NNR Board. He gained his BSc in mechanical engineering at the University of the Witwatersrand, followed by his MSc and PhD. His PhD was concerned with the development of risk based heat stress limits for men working in hot humid conditions underground. He has 20 years' experience in mining-related research, and served as CEO of the Chamber of Mines Research Organisation before moving to the Chamber's head office. He was deeply involved in the formulation of both the ILO Convention on Safety in Mines and the Mine Health and Safety Act, served on innumerable academic and research bodies, and was chairman of many industry committees while employed by the SA Chamber of Mines. His work focused mainly on safety, the environment, technology and the economics of the South African mining industry. His current consultancy work is concerned with sustainable development issues, mainly in relation to the mining industry.



MRS T N ZUNGU

(Alternate to Dr de Waal)

Mrs Zungu is the Chief Director: Audit Services in the Department of Minerals and Energy, and serves on four parastatal audit committees. She gained her BComm. (Accounting and Auditing) at the University of Zululand, followed by a post-graduate Higher Diploma in Education (Commercial) at the University of Durban-Westville and specialised in-house training with Unilever (SA) and Shell (London) while employed in those companies' accounting and auditing divisions. She also taught high school accounting and business economics for three years. She joined the internal audit division of the DME in 1999, was promoted to her present post in 2003.



MS T MGODUSO

Ms Mgoduso, Deputy Chairperson of the NNR Board, is the CEO of Freightdynamics, a Transnet business unit, and has held numerous other Transnet responsibilities, largely in the human resources and training fields, since 1994. Previous employment was with Wesbank as Manager: Human Resources, the Health Psychology Unit of Unisa, engaged mainly in research, lecturing and psychotherapy, and as a clinical psychologist at the Chris Hani and Valkenberg/Groote Schuur Hospitals. She gained her BA and BA Hons at the University of Fort Hare, followed by scholarships in Germany and her MA in Clinical Psychology at the University of the Witwatersrand, followed by management studies at the Wits Business School and specialised courses in the US, UK and Singapore. She serves on numerous social, community and parastatal bodies.



MS T KUMALO

(Alternate to Dr J M Matjila)

Ms Thembisile Kumalo is the Deputy Director: Hazard Management and Pollution Information at the Department of Environmental Affairs and Tourism. She gained her B.Sc. Hons in Biochemistry and Microbiology at the University of the North, her M.Sc. in Biotechnology at University College, Dublin, and is working on a PhD in Applied Environmental Science. She represents DEAT at workshops, conferences and other functions, and represents South Africa at regional and international meetings, e.g. the Basel Convention on the Transboundary Movement of Hazardous Waste and the Stockholm Convention on Persistent Organic Pollutants. She is also involved in promoting women in technology and in community development projects.

The Board



DR S W P DE WAAL

Dr de Waal is the Director: Nuclear Safety in the Department of Minerals and Energy. He gained his MSc in radiation biology at the University of the Free State and PhD in zoology at Natal University. He has undergone extensive nuclear-related training including in severe accidents and accident management in Light Water Reactors (OECD Nuclear Energy Agency, France) and Probability Safety Assessment (an IAEA course). He has 23 years' experience in nuclear/radiation safety, 16 years' nuclear regulatory experience, and 5 years' experience in project management and nuclear governance. He is currently responsible for nuclear policy matters and the administration of legislation related to nuclear safety.



MR D ELBRECHT

Mr Elbrecht represents organised labour and is the National Treasurer and a member of the National Executive Committee of the National Union of Mineworkers. He holds an NTC 6 certificate and numerous management and leadership qualifications. He worked at Koeberg Nuclear Power Station for eight years, rising to manager of the Maintenance Centre. He was appointed non-executive chairperson of the Mineworkers Development Agency in 2002. His international exposure includes serving as a delegate to the international conferences on energy in Rio de Janeiro 2001 and Rome 2002, and vice-chair of the workers group at the ILO-Geneva 2003. He took part in official study tours in 1994 and 1999.



MR H MOTAUNG

Mr Motaung is the president of the African Mining Association and Chief Executive Officer of Pelawan Investment (Pty) Ltd. He is a BSc. Engineering (Mining) graduate of the University of the Witwatersrand, and holds an MBA degree. He has numerous prizes and awards to his name, including the Maths Science Olympiad, and played extensive leadership and sporting roles during his education. He was a mining engineer with Anglo American prior to joining the Department of Minerals and Energy as a Director:Health and safety ,rising to Deputy Chief Inspector.. He was involved in the implementation of the Mine Health and Safety Act throughout the mining industry, and represented the Department at numerous international conferences on mine health and safety. He has served on numerous statutory committees, including SAQA and Nedlac. His community work includes facilitating the maths and science preparedness of matriculants from underprivileged communities.



MS T MASHANDA

Ms Mashanda is the Finance Manager (Africa) at Multichoice (Africa) (Pty) Ltd. Previous employment was as senior audit Manager with Nkonki Sizwe Ntsaluba Inc and as articled clerk with Coopers and Lybrand. She qualified as a chartered accountant in South Africa in 2000, after gaining her BA Hons (Accounting) at Thames Valley University (UK).



DR T LESOLI

Dr Lesoli manages a health products distribution company, Mother Earth Distributors, marketing branded food supplements and doing health and nutrition educarion. Previous employment was largely in the hospital and healthcare fields, and in private medical practice in KwaZulu-Natal and Gauteng. Her school education was in Lesotho and the UK, followed by her MB BS at the University of London, and a Diploma in Child Health and AIDS counsellor's course in SA. She is a registered medical practitioner with the SA Medical and Dental Council and British General Medical Council. She serves on numerous community bodies, mainly in the fields of health care, medical, children's and women's interests.



ADV B M MKHIZE

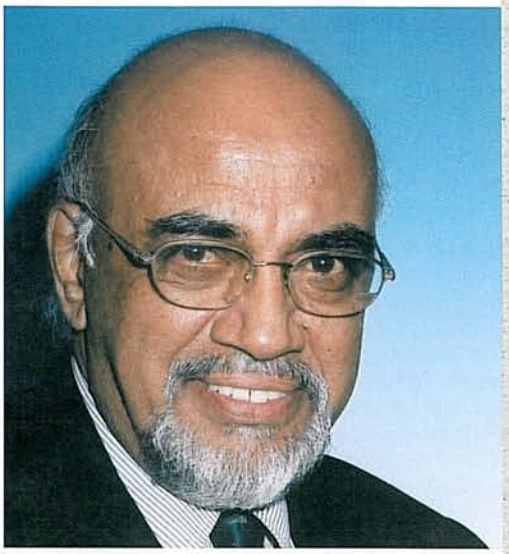
Adv Mkhize is the Registrar and CEO of the Health Professions Council of SA. Previous employment was as Chief Legal Adviser and Company Secretary of the Atomic Energy Corporation of SA, the Director: Human Resource Management of the Department of Home Affairs, Executive Assistant to the Minister and Head of Ministry in the Department of Public Service and Administration, and training and advisory posts with the Constitutional Assembly, Community Law Centre and University of Zululand. He gained his B. Juris and LLB at the University of Zululand, Advanced Diploma in Labour Law (cum laude) and Business Management Programme at Unisa, and was admitted as an advocate of the High Court of SA. He has served on numerous church, community and training bodies



DR J M MATJILA

Dr Matjila is the Chief Director: Environmental Quality and Protection with the Department of Environmental Affairs, after having served as Director: Research and Technology Development. Prior to that he was with the Department of Minerals and Energy as Deputy-Director Mineral Development (Environment) and Assistant Director: Environment. He also served as Senior Hydrologist with the Department of Water Affairs and Forestry, and in lecturing posts with Rhodes University and the Universities of Pretoria and Mmabatho. He gained his BSc Hons (Chemistry) at Unibo, his MSc at the University of Pretoria and his PhD in chemistry at Rhodes University. He is registered as a Professional Natural Scientist with the SA Council of Natural Scientific Professions, has delivered papers at numerous conferences, taken part in foreign missions, and is a member of numerous industry committees and boards.

CHAIRPERSON'S FOREWORD



Prof. K. Bharuth-Ram

I am pleased to report that progress towards meeting the NNR's nuclear regulatory mandate, without compromise of its commitment to the demographic transformation of the organisation, was continued during the past year. The mandate of the NNR is to protect persons, property and the environment against nuclear damage. We are tasked to do this within a regulatory frame work prescribed by the National Nuclear Regulatory Act, which establishes the NNR as an independent regulatory body. The NNR has zealously guarded this independence in all its dealings with its range of stake holders: Government, authorization holders, staff and affected communities.

This year marks the 10th anniversary of our fledgling democracy, and, like our Government, the NNR has made significant strides in shedding the shackles of its bureaucratic, exclusive and secretive heritage, and introducing a new culture of transparency, inclusiveness and openness in its dealings with its stakeholders. At the same time, the NNR has had to ensure that we keep abreast of all trends, events and developments in the industry so as to benchmark our practices, processes and standards against international norms. A good example of this was the emergency safety exercise conducted at the Koeberg Nuclear Power Station earlier this year. Representatives from the regulatory authorities from France and the USA were invited to participate in the exercise, as were the NNR Directors, representatives of the DME, local government, SAPS and community organisations. Delegates were teamed with NNR personnel to observe the various stages of the exercise at first hand. Report back from the various delegates at a debriefing session after the exercise confirmed the general high quality of our safety standards and procedures, as well as provided valuable input on areas that merited additional attention.

It was pleasing to note from the input from, and interaction with, our international peers, the high regard in which the NNR is held internationally. This was also evident at the recent International Radiation Protection Congress held in Madrid, and in the many participation of NNR staff in international meetings (see details in this Report).

Good progress has been made in addressing the demographic balance in the NNR: Top Management now comprise 20% Black female and 60% Black male, while Senior Management comprises 20% Black female and 37.5% Black male. However, the continuation of the organisational restructuring has not been without its concomitant difficulties. Some staff have been reluctant to accept their re-deployment within the new structures in the organisation, and have either exited the organisation, or engaged in time consuming and debilitating grievance procedures. Fortunately, we appear to be over this phase, and can now re-focus our attention on our capacity building and succession planning imperatives. Some success has been achieved already with our sister organisations overseas providing opportunities for the training of NNR staff. Locally, the NNR is engaged, together with NECSA and the regional universities, in developing a postgraduate training programme in nuclear sciences. The capacity building and skilling programmes form part of the strategic plan of the organisation, the key elements of which has been informed by a SWOT analysis conducted during the year. The strategic plan was further informed by input from a stakeholder survey.

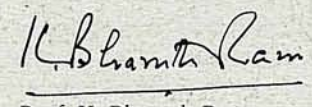
Capacity building in the nuclear sciences remains a major challenge not only for the NNR but for our country in general, and will remain so for the foreseeable future. On the one hand the nuclear skills base in the country is limited (or ageing). On the other, a new and challenging nuclear technology (PBMR) may be looming on the horizon. Globally too, energy demands in both developing and developed have continued to increase, and marrying this to adherence to the Kyoto Protocol on carbon dioxide emissions is forcing nations to turn their attention once again towards a new generation of nuclear power stations. In order to keep abreast of these international developments we must invest in the training and development of the required skills. The challenge for the NNR will be to ensure that it has the skilled resources required to address the safety case for any new technology.

The NNR's total income for the year was R49.70 million, of which R7.61 Million came from Government. The major component of the revenue came from services rendered to holders of nuclear licence holders (ESKOM (Koeberg Nuclear Power station and the PBMR project) and NECSA) and holders of certificates of registration (mines and small users of nuclear radiation).

The Board has continued to measure the NNR's performance against four elements of the its operation. These are the organisation's core business (protection of people and the environment from the harmful effects of nuclear radiation), internal business processes,

stakeholder satisfaction, corporate service processes and human resources. The first two have been interrogated in reports on compliance against key performance indicators submitted to Board meetings, and in stake holder surveys, respectively; the third in meetings of the Board's Finance and Audit and Risk Management Committees, and the last in meetings of the Transformation and Development Committee. I am satisfied that the NNR has remained committed to excellence in its service delivery, independence and ethical conduct. During the past year there were no major concerns regarding the safety of workers, the public and the environment associated with authorized sites and installations. Nonetheless, review and improvement of all aspects of the NNR's operation are ongoing.

In conclusion, I wish to sincerely thank my Board of Directors for their critical and creative contribution to the Board's affairs, and to the Chief Executive Officer and her team for their willing support at all times. I also extend special thanks to the outgoing members of the Board, in particular, Ms Ellen Mahomed, Prof. S Taole and Mr. R. Lockwood whose term of office on the Board ended in August 2003. A warm word of welcome goes to the members of the new Board- I look forward to working with you in directing the affairs of the NNR.



Prof. K. Bharuth-Ram
Chairperson, NNR Board of Directors

CHIEF'S EXECUTIVE OFFICERS'S FOREWORD



Adv L B Zondo

In my report last year, I mentioned the major challenges facing the NNR, namely delivering on its prescribed mandate while confronting transformation, as well as the urgent need for capacity building, training and development. Accomplishment of these tasks would require creative thinking and appropriate planning.

More often than not, a good point of departure when faced with a daunting task is to determine the status quo of the institution, how much has been achieved and what still needs to be done, and then to plan and strategise accordingly. Since the NNR is required to ensure the best interests of its stakeholders, a reliable means of determining the status quo of the NNR would be via a stakeholder survey. This year saw the NNR commission its second stakeholder survey. The first survey was conducted in 2001, and this second survey would enable us to benchmark our progress on a number of issues that were identified and explored in the first survey. I am pleased to say that the second survey showed a marked improvement in stakeholder satisfaction in all areas barring one (which related to governmental perceptions). Even though the results of the survey affirm our commitment to providing a more people-friendly, transparent and honest service, we dare not and will not rest on our laurels. We shall continue our efforts to improve our service and thus our image on all fronts. It is our mandate to protect persons, property and the environment against nuclear damage. It is our goal to do so in a friendly, transparent, efficient and inclusive manner.

As the basis for formulation of our strategic plan we conducted a SWOT (strengths, weaknesses, opportunities and threats) analysis. A number of sectors were identified under each heading, and were taken into consideration in devising the plan, to build further on the strengths of the organisation, address weaknesses, capitalize on opportunities and neutralise or mitigate threats before they materialise. The strategic plan was further informed and influenced by inputs received from civil society, directly and via forums established with various stakeholder groups such as communities living around nuclear facilities.

The success of many of the management imperatives implemented under the strategic plan is reflected in the above-mentioned stakeholder survey. The survey revealed that stakeholders are satisfied with the co-operation of the NNR, particularly when it comes to meetings. Appreciation was expressed for the level of seniority of NNR meeting attendees. Stakeholders were also impressed by the NNR's technical competency, our commitment to responding to communications, and our willingness to listen to problems and complaints. The NNR is committed to building on and improving our relations with all of our stakeholders.

The NNR continues to be vigilant in executing its mandate to protect. Our Chairman has already expressed pride and pleasure at the success of our Koeberg Safety Exercise. This event allowed us not only to monitor our own safety efforts and initiatives, but also to build on our relationships with our peers in the nuclear industry, both in Africa and farther afield. We are convinced that we are well placed in the international nuclear community and we continue to seek ways and means to give even better effect to our mandate, through co-operation and other agreements, and through compliance with internationally recognised safety standards. In this regard, the public needs to be made aware of the significant number of international and national nuclear "watchdogs" whose task it is to monitor and ensure compliance with nuclear safety standards relating to nuclear operations and activities. As a signatory to the Convention on Nuclear Safety, the NNR is obliged to fulfil national obligations in respect of international legal instruments concerning nuclear safety.

The NNR continues to make a concerted effort to communicate openly and transparently, especially in its interaction with civil society. In this regard it has established a variety of forums with which it has regular interaction. These forums include workers' forums, community forums, and health and safety regional forums. We believe that these forums will continue to be instrumental in conveying our message of independence, honesty and accessibility to people at grassroots level.

Internally, the NNR is committed to capacity building and equity and we have achieved some success in this regard through training abroad. Locally, we continue with our efforts to work with tertiary institutions and other entities to provide both the means and the avenues for students to qualify in our field of study. These initiatives are ongoing in our quest for ways and means to improve our resources in order to attract and keep staff with the required skills, and, more importantly, redress past imbalances and strive to meet equity targets.

During the year the Minister of Minerals and Energy published regulations on public safety information forums, for nuclear licence holders to establish forums with the communities

living around their authorised facilities for the purpose of discussing and keeping the communities informed of safety measures. Draft Safety standards were also published for comment, and are being included in the NNR's strategic plan focus for 2004-2007.

In conclusion, I would like to express my sincere appreciation to the outgoing Board of the NNR, the Minister of Minerals and Energy and, through the Director-General, to the Department of Minerals and Energy for the guidance and support that they have offered me personally and to the organisation as a whole. I would like to thank and pay tribute to the management and staff of the NNR for their efforts during the year under review. To the new Board members I extend my sincere appreciation for their willingness to serve and I wish them every success for their terms of office. We remain united in our efforts to continue improvement in the delivery and execution of our mandate to protect the public, property and environment of South Africa against nuclear damage, and we shall continue to fulfil this obligation as required by legislation, to the best of our ability.

ADV L B ZONDO
CHIEF EXECUTIVE OFFICER

KOEBERG NUCLEAR POWER STATION

BACKGROUND

Eskom operates the Koeberg Nuclear Power Station, comprising two 900 MWe pressurised water reactors (PWRs), on the Atlantic coast 40 kilometres north of Cape Town. The station was built by a French consortium, with Framatome having responsibility for the nuclear island, Alsthom Atlantique for the conventional island, Spie Batignolles for the civil works and Framateg for the overall project co-ordination. Following the Regulator's satisfactory review of the Nuclear Licence application, the first Nuclear Licence NL-1 was issued to Eskom for the construction of the power station, which commenced in 1976. The two units were brought into commercial operation in July 1984 and November 1985 respectively.

In terms of the National Nuclear Regulator Act (NNRA), nuclear installation licences are subject to conditions deemed necessary to ensure the protection of persons, property and the environment against nuclear damage. The current Koeberg Nuclear Installation Licence NL-1 variation 14 is subject to 16 conditions, including specific licensing requirements and control pertaining to :

- Plant description and configuration
- Safety assessment
- Scope of activities that may be undertaken
- Controls and limitations on operation
- Maintenance and in-service inspection
- Operational radiation protection
- Effluent management
- Waste management
- Environmental monitoring
- Emergency planning and preparedness
- Transport
- Physical security
- Quality management
- Acceptance and approval
- Reports
- General

In terms of Section 26(2) of the NNRA, Eskom, as the nuclear licence holder, implements an inspection programme to ensure compliance with the conditions of the Nuclear Installation Licence NL-1. Likewise the NNR implements an independent system of compliance inspections to provide assurance of compliance with the conditions of the nuclear licence in terms of section 5(d) of the NNR Act. The regulatory approach to the licensing of nuclear installations such as KNPS is largely based on risk and the application of international safety standards.

SAFETY ASSURANCE

1. OCCUPATIONAL EXPOSURE TO RADIATION

Radiation exposures of personnel working at Koeberg are subject to control by the operational radiation protection programme. This programme ensures that control within the annual individual dose limit is achieved. In addition, the programme also serves to ensure that all doses are kept as low as reasonably achievable (ALARA).

The highest annual individual dose accrued during 2003 was 17.29 mSievert (mSv), compared to the regulatory limit of 50 mSv per annum. The total annual collective dose to the workforce for the year was 2.04 person-Sv. The total occupationally exposed workforce during 2003 numbered 2049, indicating an average annual individual dose of approximately 0.99 mSv. The figure below illustrates the dose distribution arising from the individual exposures accrued from 2001 to 2003.

A major contribution to the total collective dose was the work performed during refuelling outages 113 and 213, where 0.802 person-Sv and 0.835 person-Sv were accrued respectively. The collective dose accrued as a result of the outages contributed 80.2% of the total annual collective dose recorded for 2003.

In terms of occupational exposure there were thus no concerns regarding the safety of workers at KNPS.

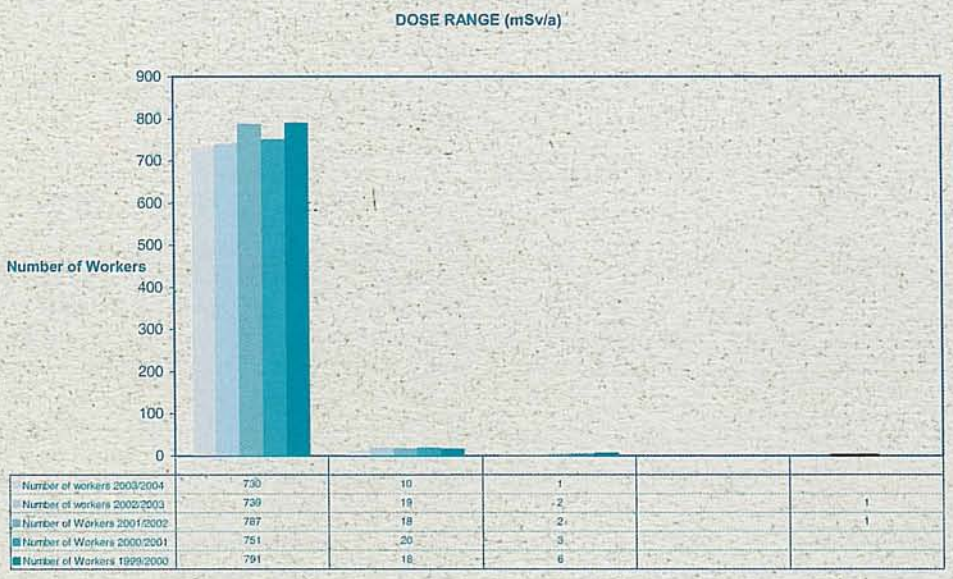


Figure 1:
Occupational exposure

2. PUBLIC EXPOSURE TO RADIATION

Various gaseous and liquid radioactive emissions and effluents are produced during the process of nuclear power generation. These emissions and effluents are treated by dedicated clean-up systems, which remove most of the radioactivity from them prior to discharge to the environment. However, during the operation of any nuclear power station it is inevitable that small amounts of radioactivity will be released to the environment. Public exposure is controlled within strictly defined limits through the implementation of a radiological emissions and effluent management programme, which ensures that the discharges of radioactivity from Koeberg result in no significant risk to the public. A key feature of this programme is the control of radioactivity in effluent discharges to within the Annual Authorised Discharge Quantities (AADQ). In addition to continuous monitoring of radioactivity in effluent, radiological surveillance of the environment is also carried out. In this way an independent and strict control on public exposure to radioactive releases is maintained.

Radioactivity in liquid and gaseous discharges from Koeberg during 2003 contributed a projected total individual dose of 12 µSv to the hypothetically most exposed group. The projected dose as a result of gaseous and liquid discharges was 0.34µSv and 11.87µSv respectively, which is well within the NNR limit of 250 µSv per annum.

The AADQ system of Koeberg is based on an activity migration model that features the migration of activity from the fuel via the clean-up systems and effluent treatment systems and various drain systems up to the point of discharge. In the development of the model, design features and assumptions have been used. The ultimate result of the activity migration exercise is the annual amount of effluent release in Bq on a nuclide-specific basis.

The annual projected dose arising from effluent discharges from Koeberg is higher than in previous year(s), but still much lower than the NNR limit. The radionuclides contributing the highest dose as a result of atmospheric and liquid discharges are shown in the following table. The reason for the increase in dose compared to the previous year(s) can be attributed to a more accurate and realistic method of modelling doses to the public during normal operations. The revised system is based on the latest international guidelines in modelling releases, as well as software codes.

The NNR is currently in discussion with Koeberg to establish an annual ALARA dose target for effluent discharges commensurate with operational limiting conditions as far as fuel clad failure and effluent processing are concerned.

Koeberg must comply with the ALARA dose target during normal operation in order to provide assurance that effluent discharges are optimized.

Table 1:

Percentage of AADQ discharged in effluent during 2003

Liquid Transport Pathway		Atmospheric Transport Pathway	
Radionuclide	% of AADQ	Radionuclide	% of AADQ
Co-58	60.01	Co-60	5.86
Co-60	17.10	H-3	1.37
Co-57	71.82	I-132	4.92
Sb-125	19.02	I-133	1.53

Sb-124	36.64	I-134	5.69
Ag-110m	38.24	I-135	2.37

There were no concerns regarding the safety of the public living around KNPS during the reporting period.

3. ENVIRONMENTAL SAFETY

The Koeberg Environmental Surveillance Programme, involving the sampling and analysis of representative environmental media, is performed in order to verify that effective control has been maintained over effluent discharges. The small amounts of tritium released from Koeberg could not be identified in either inland surface water or in seawater. Sensitive gamma spectrometric measurements of biological materials, soil and air samples, vegetation and food, did not reveal any contamination, although very small quantities of 110mAg(silver) and 58Co(cobalt), originating from Koeberg operations, were found in some marine samples. As a demonstration of the equipment sensitivity, natural radioactivity is routinely measured in the majority of samples in which none of the effluent activities are in evidence. Very small amounts of Koeberg effluent could be identified in sewage sludge, while reportable activities of 131I(iodine), originating from therapeutic or diagnostic medical treatment of local residents, were detected on various occasions in Melkbosstrand sewage sludge. A widespread network of Environmental Thermo-Luminescent Dosemeters (TLDs) around Koeberg monitor the external exposure to active gaseous effluents from Koeberg. As in previous years, there were no indications of external radiation above normal background levels, whether close to the power station or further afield. The environmental surveillance programme has confirmed adequate control over effluent discharges in the period under review.

4. NUCLEAR SAFETY

As in previous years a major part of the NNR's work in the area of nuclear safety relates to in-depth safety assessments associated with Koeberg Nuclear Power Station. During this period the NNR focused its safety assessment activities on the main areas summarized below:

4.1 Plant Refuelling Outage 213 Modifications

The NNR completed its review and approval of the following modifications implemented during Koeberg Unit 1 refuelling outage 213.

Replacement of obsolete Fisher controllers

Rerouting of drain lines on steam vent and turbine

Software change to allow crane to enter up-ender zone

Prevention of run-back on loss of LNE

Modification to the fire damper actuation mechanism

Modification of pipe work to accept equivalent lube oil pump

Installation of generator core monitor

4.2 Koeberg alignment to French CP-1 plants

Eskom has submitted a licensing framework for 88 modifications considered necessary to upgrade Koeberg to bring it into closer alignment with French CP-1 plants in response to the findings of the Koeberg periodic review completed in 1998 and a concept design for the first three modifications to be implemented during refuelling outage 114 in March 2004 (on Unit 1) and outage 214 in January 2005 (on Unit 2). The plan is to implement the full set of modifications over a five-year period.

The NNR is presently assessing the extent to which the modifications referred to above address the corrective actions needed to close-out the findings of the Koeberg Periodic Safety Review.

4.3 Modifications linked to severe accidents

In the light of developments in the vicinity of Koeberg, Eskom has implemented a number of improvements to enhance the safety of the plant, particularly relating to the prevention and mitigation of severe accidents. These include the Severe Accident Management Guidelines for accidents initiated from full power operation, Severe Accident Management Guidelines for accidents initiated from shutdown conditions, Koeberg strategy on hydrogen control, updating the Koeberg late phase emergency plan, and an updated probabilistic risk assessment for Koeberg using state-of-the-art modelling and computer codes. As part of these initiatives a number of modifications linked to severe accident management are also being investigated by Eskom.

During 2003 Eskom submitted a request to implement a modification which would

provide an additional means of cooling the reactor vessel and core material in the reactor cavity in the event of a severe accident. In principle this would provide an additional level of protection for the second and third barriers (the reactor vessel and pipe work of the primary circuit, and the containment building). Since the issues associated with this and other modifications are part of ongoing international initiatives, the NNR has requested the opinion of overseas nuclear regulators on the physical phenomena associated with this modification.

The NNR has taken up issues relating to severe accident modifications, emergency planning and urban developments in technical discussions held with other nuclear regulators in September 2003. The NNR also attended a workshop held in Cape Town, organized by Eskom and involving the French utility Electricite de France (EdF), the NNR and Cape Town Unicity authorities, at which presentations were made by EdF on these matters.

The NNR has required Eskom to provide its position and plan of action on the issue of containment sump filter blocking in the event of a loss of coolant accident (LOCA) at Koeberg, in the light of a decision by the DGSNR (France) to report this issue at level 2 on the International Nuclear Event Scale (INES) for the French family of nuclear power reactors. Eskom has provided its plan of action, which takes into account the US and French approaches to this problem. The outcome of assessments being conducted in France is awaited before any steps are taken in respect of Koeberg.

4.4 Koeberg Nuclear Fuel Management Strategy

Nuclear Fuel

The assessment of the "Improved Fuel Management Project" involving more highly enriched fuel (4.4%) for refuelling outage 213 (i.e. Unit 2 cycle 13) in October 2003 was completed. The French IRSN (the technical support institution to the French regulator DGSNR) assisted the NNR with the technical assessment of this application. The fuel was loaded into Koeberg Unit 2 during outage 213 following approval by the NNR.

Spent fuel storage

The NNR approved an application by Eskom to extend the three-year period for use of the Castor-X Dry Storage Casks for another five years. The NNR assessment concluded that continuation of storage of the spent fuel in Castor X28 casks will not compromise the integrity and shielding of the casks, and the extended storage period would not adversely affect the fuel cladding. Additionally, the NNR reviewed and accepted certain improvements proposed to the cask storage facilities, including provision for alternative power supplies, additional alarms and remote monitoring.

4.5 Plant Condition Management

The NNR monitors plant condition management at Koeberg through specialist meetings, assessment of safety submissions by Eskom, and inspections and audits. The following are focus areas for plant condition management during the reporting period and into 2004:

Steam generator integrity
Primary loop cast elbows
Reactor pressure vessel (RPV) integrity
In-service inspection Second Interval Programme
In-service inspection Third Interval Programme
Risk-based In-service Inspection Project
USA Davis Besse Nuclear Power Plant incident

4.6 Probabilistic Risk Assessment

The NNR participated in two workshops (one in Paris and the other in Cape Town) with the French and Belgian regulators. Eskom also attended the workshop in Cape Town. The purpose of the workshops was to conduct a comparison between the risk studies for Koeberg, the French 900 MWe-series nuclear power plants and the Belgian nuclear power plant Tihange-1, all of which are of similar design to Koeberg. This followed two earlier workshops conducted in 2002/2003. Many differences in analysis techniques were identified, resulting in changes to these studies. A general outcome of this exercise is that the comparison has given the NNR greater confidence in the Koeberg risk assessment, and the results indicate that the overall level of safety of Koeberg is similar to that of the French and Belgian plants.

5. LICENSING OF KOEBERG REACTOR OPERATORS

The biennial evaluations of licensed operators, as required by the licence conditions, took place in 2003. Biennial evaluation is an integral part of the licensed operator re-qualification training and is designed to measure the effectiveness of the re-qualification programme

and to provide long-term maintenance of established standards. This measure is derived from a full scope assessment of individual and team skills and knowledge, and consists of written, walkthrough and dynamic simulator evaluations. The licences of the successful operators (18 Senior Reactor Operators and 37 Reactor Operators) were renewed for another two-year period. There were no failures.

6. RADIOACTIVE WASTE SAFETY

The generation of solid radioactive waste amounted to 86.94 m3, drummed in metal drums and 37.38 m3 drummed in concrete drums. The inventory of the drummed radioactive solid waste produced in 2003 appears in the following table.

Inventory of solid radioactive waste produced in 2003 and drummed in various types of drums.

Table 2

Type of solid radioactive waste	No. of drums
C1 drums containing non-compressible waste	24
C1 drums containing concentrates	48
C1 drums containing resin	18
C2 drums containing resin	15
C4 drums containing filters	9
C2F drums containing filters	4
210 litre metal drums containing general trash	336
210 litre metal drums containing resin	168

Radioactive waste shipped to Vaalputs in 2003 amounted to 50.40 m3 in steel drums and 69.847 m3 in concrete drums.

7. TRANSPORT SAFETY

Table 3

Fuel consignments on site	1
Radwaste consignments	45
Other materials (sealed sources etc) onsite/offsite	8

There were no incidents involving the transport of radioactive material and all consignments complied with safety requirements.

8. EMERGENCY PLANNING AND PREPAREDNESS

Koeberg Emergency Exercise

The National Nuclear Regulator conducted an emergency exercise at the Koeberg Nuclear Power Station (KNPS) on 18 February 2004. The exercise is one of the means by which the NNR tests the adequacy of Koeberg and local authorities to respond to a nuclear emergency.

The overall objective of the February 2004 exercise was to test the response of both the on-site and off-site organizations. The specific objectives of the exercise included the recognition and classification of the emergency, the use of the alternative emergency control centre in Bellville, communication and liaison between the intervening organizations, the evacuation of about 200 Eskom personnel to a mass care centre in Goodwood, and the functioning of the mass care centre.

Overall, the exercise was considered a success. Problems and potential improvements were recorded by the umpires and observers, and reported at feedback sessions following the exercise. As part of the exercise the NNR invited VIPs (local and international) to witness and observe the activities, responses and actions of the various organizations which are involved in the emergency plan of the Koeberg Nuclear Power Station. The VIPs included a Western Cape MEC and officials from the NNR Board, NGOs, the SANDF, the Department of Minerals and Energy, the Office of the Western Cape Premier, two officials from both the French regulator DGSNR and the United States Regulatory Commission (USNRC), who provided useful comments and advice on their observations of the exercise. The NNR has prepared a report on its conclusions and recommendations which will be circulated to the participants in the exercise. The implementation of the corrective actions will be followed up in various forums, primarily the Emergency Planning Committee chaired by Eskom and attended by local authorities, and monitored for progress by the NNR at the regular monthly Koeberg Licensing Liaison Committee (KLLC) meeting held between Eskom and the NNR.

Directive issued to Eskom in terms of Section 38 (1) of the NNR Act

In terms of section 38(1) of the NNR Act (Act number 47 of 1999), the NNR is required to direct Eskom as a nuclear authorization holder to enter into an agreement with the relevant municipal and provincial authorities to establish an emergency plan for Koeberg and submit the plan to the NNR for approval. While the Koeberg emergency plan has been in place for many years, the NNR formally issued such a directive in 2003 to Eskom, which in conjunction with the Unicity of Cape Town, has produced an agreement for signature by the relevant authorities. The agreement will be signed once the Disaster Management Act is in force as this act specifies various responsibilities which impact on the agreement.

South African delegation visit to France

A delegation from South Africa represented by delegates of the Department of Minerals and Energy, the National Nuclear Regulator, the Provincial Government of the Western Cape and Eskom visited the French Utility Electricite de France (EdF) in Paris from 22-28 November 2003 in order to obtain information relating to emergency planning and preparedness.

A Director of the NNR Board, Mr D. Elbrecht, represented the NNR in the delegation.

A report compiled by the delegation contains recommendations which are being followed up by the relevant institutions concerned. Some actions resulting from these recommendations have already been progressed, such as the Emergency Planning Workshop (reported above) organized by Eskom with the participation of EdF specialists and attended by the NNR, which took place in January 2004.

Mr Elbrecht also reported on his observations during a feedback session which was attended by staff members of the Executive and Eskom.

Developments around Koeberg

In terms of section 38(4) of the NNR Act, the Minister of Minerals and Energy may, in consultation with the relevant municipalities, make regulations on developments in the vicinity of a nuclear installation to ensure the effective implementation of any applicable emergency plan. Such a regulation was prepared and published on 5 March 2004 and is now in force. This regulation requires the NNR to establish specific requirements after consultation with the relevant municipalities, related to the control and/or monitoring of developments surrounding a specific nuclear installation.

The municipalities are required to develop and implement processes, including associated acceptance criteria, taking into account the NNR requirements for the assessment of current and planned population distributions, disaster management infrastructure and developments in the formal emergency planning zones of the nuclear installation, to ensure that the emergency plan can be implemented effectively at all times. The processes referred to must be documented in procedures which are acceptable to the NNR, and the relevant municipalities must report to the NNR on the implementation and the results of the monitoring processes at agreed intervals.

The NNR's work to develop the requirements to be applied in the assessments performed by the authorities, is progressing and should be completed in mid-2004.

Linked to the above requirements, workshops were conducted by Eskom and the local authorities in August and September 2003 on a Traffic Model, which is an analysis performed to determine the time taken to implement the evacuation of an affected area in the event of a severe accident at Koeberg. A plan has been developed according to which the traffic model issue will be addressed by July 2004. The NNR will continue to monitor the progress of the actions.

The NNR is confident that the introduction of this new regulation will contribute positively to the control of developments around Koeberg and ensure the effectiveness of the emergency plan while allowing for socio-economic development in the region.

Emergency Plan Late Phase aspects

During 2002 it was decided that the late phase aspects currently in place in the Koeberg emergency plan should be revisited. This was prompted partly by new requirements from the NNR Act (e.g responsibilities of the Western Cape Provincial Administration in the Koeberg emergency response), the development of other national legislation such as the Disaster Management Act, and discussions with the Chief Director: Emergency Management in the Western Cape . For this purpose the (Koeberg) Emergency Planning Steering and Oversight Committee (EPSOC) was established.

Eskom, in conjunction with the local authorities in Cape Town, has completed the project to improve upon the late phase aspects of the Koeberg emergency plan. The "late phase" aspects of the emergency plan typically commence several days after the accident when work commences to reduce radiation levels in the environment to permanently acceptable levels, and covers aspects such as food bans and decontamination of the environment.

International guidelines such as those of the International Atomic Energy Agency were followed in developing the plan. A tabletop exercise was conducted in 2003. The outcome of the exercise was positive. A number of deficiencies were however identified.

It was agreed at a meeting of EPSOC (Emergency Planning Steering and Oversight Committee) held on 13 January 2004 that the Koeberg Late Phase Emergency Plan could now be signed by the relevant authorities once the timescales provided in the plan to address the outstanding deficiencies had been satisfactorily revised. Once this is done the plan will be submitted to the NNR for approval as an integral part of the overall Koeberg Emergency Plan.

Once approved, based on an international review of emergency plans in other countries, Koeberg may be considered to be ahead of most utilities in the world in having such a well developed late phase emergency plan.

Potassium Iodate distribution

The NNR is investigating the question of Potassium Iodate distribution in the event of a nuclear emergency, in the light of a recommendation by the World Health Organisation (WHO) and the International Atomic Energy Agency (IAEA) to lower the intervention levels for the distribution of the tablets. With the assistance of the University of the Witwatersrand, work is being done to establish an NNR position on this issue.

9. PHYSICAL SECURITY

The licensing requirements pertaining to physical security, to which Eskom must comply, are contained in Condition 12.0 of the Koeberg Nuclear Licence NL-1 variation 14. This condition specifically refers to a security standard which was developed by Eskom in consultation with the security establishment in the country. The NNR accepted the standard, and compliance with it is effectively included in this condition of the licence. As part of its compliance assurance programme, the NNR conducts regular inspections (on a weekly basis) at Koeberg to verify conformance to this standard.

10. INSPECTIONS AND AUDITS

The NNR conducts inspections and audits at Koeberg as part of its compliance assurance programme to verify that Koeberg conforms to its conditions of licence.

Approximately 400 inspections were carried out by the NNR on Koeberg during this period.

A safety indicator system is used by the NNR to record and grade findings arising from the compliance assurance and assessment activities. The regulatory concerns are ranked according to a colour coded system in terms of their severity: red – unacceptable; orange – tolerable high; yellow – tolerable medium; blue – tolerable low; green – below regulatory concern.

The main concerns presently relate to configuration control in the areas of project engineering and procedure development, slow progress in addressing issues raised in the review period and frequent instrumentation problems experienced on the control rod mechanisms. Configuration control was initially ranked red on this system, but has recently been downgraded to orange. This concern is based on the number of significant errors detected by the NNR during assessments and inspections on design and procedure changes submitted by Eskom. In response to NNR requirements, Eskom has developed and is presently implementing a corrective action plan.

Two audits were performed during the reporting period on re-qualification training (11-15 August 2003) and classifications, modification and equivalencies (25-29 August 2003). On re-qualification training, four findings were identified relating to non-conformance with NNR requirements in terms of updating the training programme and various administrative controls. Four findings were raised in the audit on classifications, modification and equivalencies, two relating to the classification process, one on training and competencies, and one on record keeping.

The closure of these findings and implementation of corrective actions is monitored by the NNR at the regular licensing interaction meetings with Eskom.

Report on Vissershok samples

Following complaints by local residents in the vicinity of the Vissershok dumping ground north of Cape Town about the negative impact of this facility on their quality of life, particularly due to wind-borne dust, a local action committee engaged a private company in Piketberg, to collect air deposition samples over an extended period. In the subsequent chemical analysis, which included X-ray fluorescence, various constituents were identified, among them strontium, which is a rare earth element. No analysis of radioactivity had been

done during the chemical analysis.

A concern was raised in the local media that Strontium-90 contamination could be present and that if this were the case, it could have originated with the nuclear industry (Koeberg). It was thus that the NNR became involved with this issue.

Arrangements were made by the NNR with the SANAS (South African National Accreditation System) accredited radioanalysis laboratory at NECSA to analyse the samples for Sr-90 with high priority. According to procedure, all samples are analysed anonymously. To ensure the integrity of the samples they were couriered directly from Piketberg to NECSA.

The level of Sr-90 activity in the two consolidated samples turned out to be zero according to the accredited method of determination. Since basically no Sr-90 activity was found in the samples, this means that the strontium found by chemical means in the same samples is of the natural, non-radioactive variety, which is present in airborne particulates.

While the chemical analysis detected strontium amongst the elements in the sample, the radio-analytical results showed no radioactive strontium-90 in the samples. Various conclusions could be drawn from these results as follows:

Only natural non-radioactive strontium was found in the sample collected by E&HE over the sampling period. No radioactive strontium-90 was found in the samples.

There is insufficient reason to support an allegation that the strontium found in the samples is due to impact from nuclear activities around Vissershok.

Over the years, the results of the environmental monitoring around Koeberg have never shown levels of radioisotopes in the airborne discharges from Koeberg, which would require an analysis of Strontium 90. While this was known to the NNR, it was thought to be worthwhile to have an independent analysis performed on the samples collected by E&HE to further satisfy the public about the non-existence of radioactive strontium-90 in the samples.

The report on the analysis was circulated to various stakeholders in the Cape.

INCIDENTS/OCCURRENCES

A total of 283 incidents / occurrences were reported in the following categories:

Table 4

CATEGORY	NUMBER OF INCIDENTS / OCCURRENCES
1	0
2	15
3	268

Category 1 requires immediate notification to the NNR, Category 2 requires 24 hour notification and Category 3 requires notification within five working days.
The NNR monitors incidents / occurrences at Koeberg in the following manner:
Audits conducted on the Eskom processes relating to occurrences (i.e. plant monitoring, reporting, follow-up and close-out)
Monitoring of the implementation of these processes
Monthly meetings between Eskom and the NNR at which experience feedback is discussed
Review of Eskom reports on experience feedback and safety indicators, which reflect occurrences and trending thereof
Direct assessment of selected significant occurrences

International events are monitored by Eskom and the NNR. Eskom systematically scrutinises information from sources such as WANO (World Association of Nuclear Operators), INPO (International Nuclear Power Operations)), IAEA (International Atomic Energy Agency) and EdF (Electricite de France). Apart from monitoring Eskom processes in this regard, the NNR similarly scrutinises information from the IAEA and information exchanged with other regulatory bodies through bilateral agreements.

Through the above means, the NNR satisfies itself that the processes implemented at Koeberg relating to incidents/occurrences are acceptable and that plant safety performance is acceptable.

The reporting and follow-up of problems, occurrences and events at Koeberg represent a thorough, fully procedurised and ongoing process of investigation. The duration of a given investigation until final closeout may vary from a few weeks to several months, depending upon the extent to which complicating factors are encountered.

The most important events investigated and followed up by the NNR during this reporting period relate to failures in the control rod mechanism and minor equipment failures.

SOUTH AFRICAN NUCLEAR ENERGY CORPORATION (NECSA) PELINDABA

BACKGROUND

Established as a public company in terms of the Nuclear Energy Act, Act 46 of 1999, NECSA is wholly owned by the State and currently comprises two entities, the Pelindaba Nuclear Institute, which is concerned with statutory functions, R&D, support and facility operations, and the commercially driven Pelindaba Technology, which conducts business in a variety of products and markets.

NECSA's corporate headquarters, manufacturing plants and production facilities are located at Pelindaba 25 km west of Pretoria, and 55 km north-west of Johannesburg. The Pelindaba site covers 658 hectares of property and includes 54 hectares of built space.

Employing people in diverse areas such as radiation protection, chemistry, electronics, engineering and physics, the primary functions of NECSA are to:

- undertake and promote research and development in the field of nuclear energy and radiation science and technology;
- process source material, special nuclear material and restricted material;
- cooperate with organisations and persons in matters falling within these functions; and
- serve the State's nuclear institutional obligations.

Further, NECSA is also responsible for operating the Vaalputs Radioactive Waste Disposal Facility.

SAFETY ASSURANCE

1. OCCUPATIONAL EXPOSURE

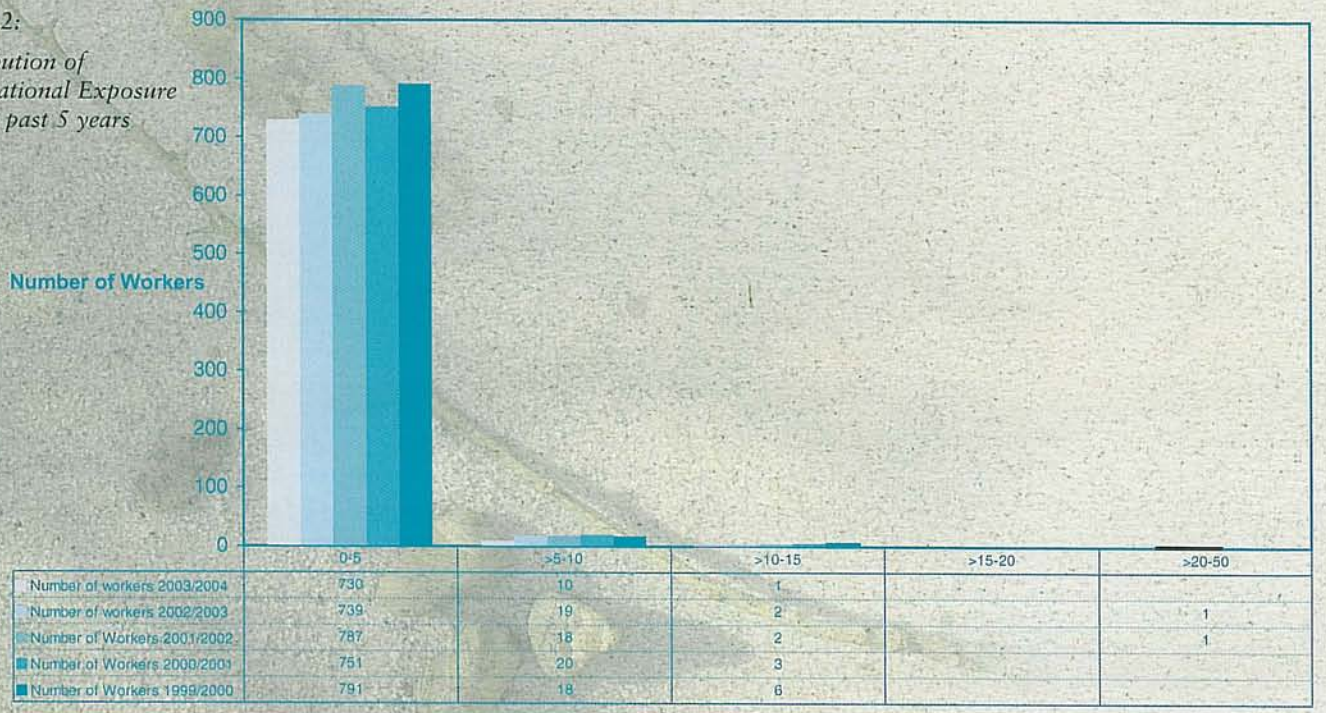
The controls over occupational exposure were comparable to the best practice internationally. The average effective radiation dose per occupationally exposed worker for 2003 was 0,66 mSv, which is 13.2% of the ALARA objective of 5 mSv.a-1.

The ALARA objective for maximum individual dose (20 mSv.a-1) was not exceeded for the calendar year 2003.

Table 5

Maximum Dose ($mSv.a^{-1}$)	11.75
Average Dose ($mSv.a^{-1}$)	0.66
Total Collective Dose (Person sievert)	0.426

Figure 2: Distribution of Occupational Exposure for the past 5 years



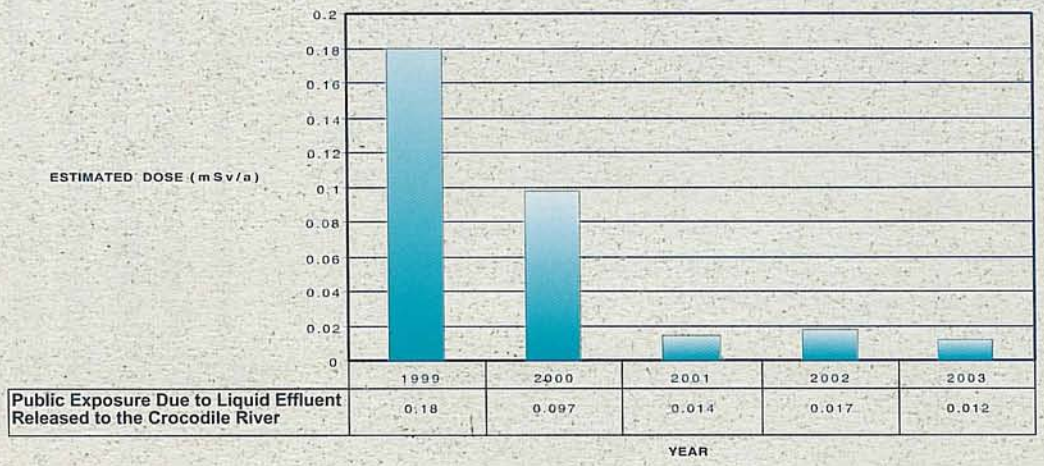
	0-5	>5-10	>10-15	>15-20	>20-50
Number of workers 2003/2004	730	10	1		
Number of workers 2002/2003	739	19	2		1
Number of Workers 2001/2002	787	18	2		1
Number of Workers 2000/2001	751	20	3		
Number of Workers 1999/2000	791	18	6		

2. PUBLIC EXPOSURE

The projected public exposure arising from liquid and gaseous discharges was 0.021 mSv, which is well within the current dose limit of 0.25 mSv.a-1applicable Liquid effluent discharges accounted for 0.012 mSv and gaseous discharges for 0.009 mSv for the 2003 calendar year. There were no safety concerns regarding public exposure to the community living around NECSA.

The following figure compares the doses as a result of liquid effluent discharges to the Crocodile River for the past five years.

Figure 3
Public exposure due to liquid effluent releases to the Crocodile River for the past 5 years



3. ENVIRONMENTAL SAFETY

In compliance with the licence requirements, various sample media are collected from the environment around the Pelindaba site. Samples are analysed and results are submitted to the NNR on a quarterly basis. The sampling locations are based on the surrounding land use and the sample media include:

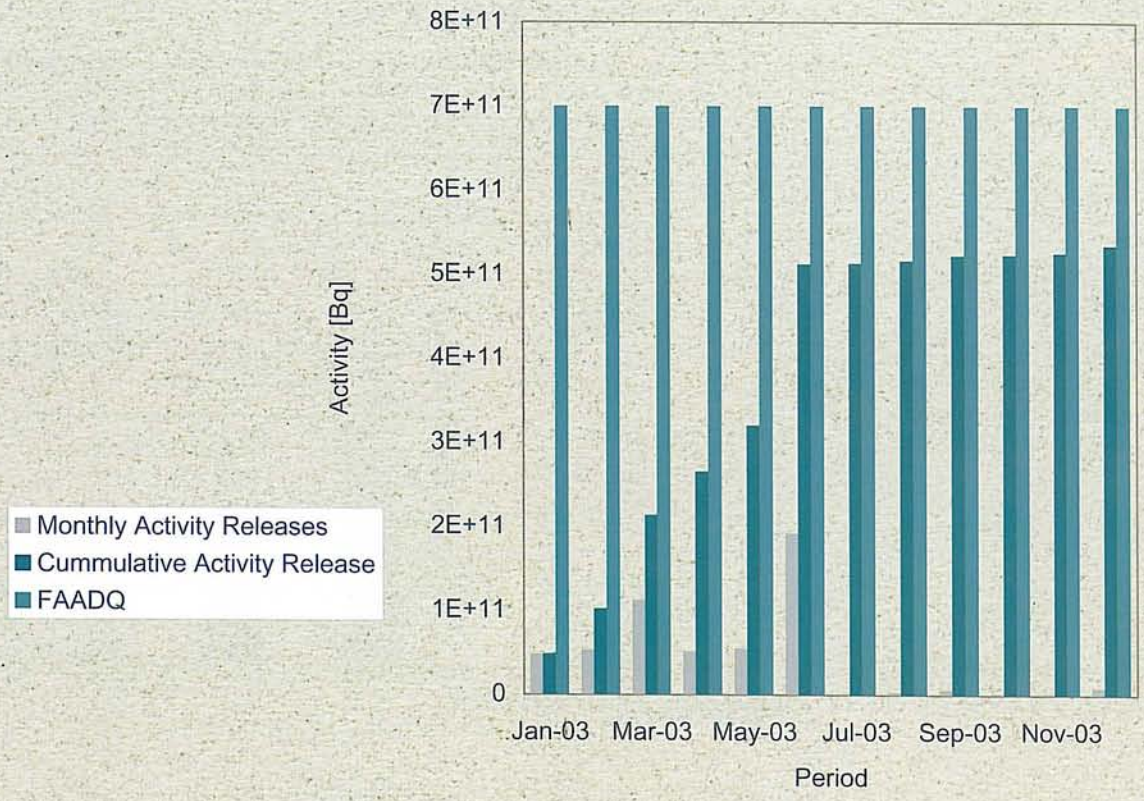
- air filter monitoring on the Pelindaba site;
- milk from surrounding farms;
- plant material in the surrounding area; as well as
- water and fish samples from the Crocodile River and Hartbeespoort Dam

In order to ensure an appropriate level of control of radioactivity in the environment, the NNR uses a system of reporting levels, investigation levels and intervention levels. This system is designed to rapidly detect any increases in environmental levels of radioactivity and ensure that appropriate action is taken to correct the situation.

NECSA reported occurrences of 131I(iodine) activity exceeding the NNR reporting level. The NNR investigated these occurrences and required NECSA to revise the controls over iodine releases at the Hot Cell Complex. Following these revisions, significant reductions in the routine iodine releases were achieved. The NNR investigation concluded that the situation had been satisfactorily corrected and that the facility's authorised annual discharge limits had not been exceeded. This is illustrated in the graph below, where the authorised annual release limit in green is compared with monthly releases (yellow) and cumulative monthly releases (blue). Note that the public exposure due to all gaseous releases, including iodine, was 0.009mSv for the calendar year.

The NNR concluded that there was satisfactory control over radioactive releases to the environment on the Pelindaba site.

Figure 4:
Iodine Activity Released per Month (2003)



4. NUCLEAR SAFETY

The NNR approved 93 licence change requests by NECSA during the reporting period. The following table below indicates the areas covered by these licence change requests.

Table 6

NECSA submissions approved by the NNR during 2003/2004	
Safety assessments	23
Facility operational technical specifications	5
Facility in-service inspection manuals	2
Radiation protection standards	7
Facility security manuals	18
Facility quality management manuals	13
Facility care and maintenance procedure	13
Transport containers (also revalidation of certificates, special form certificates & package design)	5
Facility decommissioning & decontamination procedures	3
SAFARI-1 LEU Silicide submission	3
Clearance & removal from Regulatory Control	1
Total	93

SAFARI-1

Commissioned in 1965, the 20 MW SAFARI-1 Research Reactor was the first nuclear reactor to be built in South Africa. SAFARI-1 was initially used for high level nuclear physics research, and currently accommodates a wide variety of irradiation experiments for medical, industrial and research applications

SAFARI-1 is a tank-in-pool type, light-water-moderated and cooled, beryllium and water reflected research reactor designed and built as a general research tool, falling into the class of research reactors commonly known as Material Test Reactors (MTR). The fundamental design of SAFARI-1 is similar to that of the Oak Ridge Research Reactor (ORR) in the United States, the High Flux Reactor (HFR) in the Netherlands and the STUDSVIK R2 Reactor in Sweden.

Reactor Specifications:

- The core lattice is an 8 x 9 array, consisting of 28 fuel assemblies (each containing 19 flat U/Al alloy fuel plates), six control rods and a number of aluminium and beryllium reflector assemblies.
- The reactor is cooled and moderated by light water and operates at a maximum power level of 20MW.

- In-core irradiation positions include 6 high-flux isotope production positions, 2 hydraulic, 2 pneumatic and 2 fast transfer systems which are accessible during operation. Several other irradiation positions can also be accessed when the reactor is shut down.
- A large poolside facility allows for a variety of radiation applications.
- An intermediate storage pool and transfer canal allow for easy and safe transport of activated materials to a hot cell.
- Six neutron beam tubes are available, one of which is permanently used for neutron «diffraction studies and another for neutron radiographic investigations

The first Safety Analysis Report (SAR) for SAFARI-1, PEL-75, dates back to 1965 when operation of SAFARI-1 started. Following an extensive safety re-assessment of the SAFARI-1 SAR, the SAR was included in the NL27 Licence during April 2003.

5. RADIOACTIVE WASTE SAFETY

The following table below reflects the radioactive waste generated at NECSA during the reporting period:

Table 7

Waste container	Number of containers
Metal drums (200 L)	94
Metal drums (160 L)	728
Metal drums (25 L)	4
Metal drums (other sizes)	89
Concrete drums	50
Plastic drums (100 L)	4
Plastic drums (25 L)	9
Other type containers	1

PELSTORE, an under-roof storage area of approximately 260m x 60m in Area 14 of the Pelindaba site, is the centralised storage facility for radioactive waste. During the 2003 calendar year a total of 9933 radioactive waste containers were transferred to the PELSTORE. The total number of radioactive waste containers within the PELSTORE, as at 31 December 2003, is 29946.

During the 2003 calendar year NECSA received a total of 70 drums (100 L and 160 L) containing medical waste.

There were no safety concerns regarding radioactive waste management at NECSA (Pelindaba).

6. TRANSPORT SAFETY

The following authorised transport containers/certificates were used during the reporting period:

Table 8

Certificate Number	Expiry Date
ZA/NNR 1004/B(U)-96	13 May 2007
ZA/NNR/004/S-96 (Rev. 5)	10 November 2007
ZA/2043/B(U)-96 (Rev. 19)	30 November 2007
CDN/2043/B(U)-96 (Rev. 19)	30 November 2007
ZA/2086/B(U)-96 (Rev. 3)	30 September 2003
ZA/NNR/003/S-96	1 July 2007
ZA/NNR/004/S-96 (Rev. 5)	10 November 2007
ZA/004a/S	25 July 2005
ZA/CNS 1003/B(M)-85	7 July 2004
ZA/NNR 1004/B(U)-96	13 May 2007
ZA/CNS 1005/B(U)-85	7 July 2004
ZA/NNR 1005/B(U)-96 "BEATRICE"	1 January 2009
ZA/NNR 1006/B(U)-96	7 July 2004
ZA/NNR 1008/B(U)-85 "JANE"	21 December 2004
ZA/NNR 1008/B(U)-96 "JANE"	1 January 2009
ZA/NNR 1009/B(U)-85 "ERIKA"	16 December 2004

A NNR expert team undertook a detailed review of NECSA's provisions for the transportation of sealed sources during October 2003. The review team concluded that NECSA complies with the Transport Regulations.

7. EMERGENCY PLANNING AND PREPAREDNESS

In compliance with section 38 of the National Nuclear Regulator Act (Act No 47 of 1999), NECSA has in place a comprehensive emergency plan. Over the reporting period a number of emergency exercises were conducted. The NNR planned and conducted one major exercise covering the whole Necsa site.

These exercises tested various aspects of the NECSA site emergency plan, including possible chemical and radiological hazards.

In November 2003 the NNR tested the status of NECSA's emergency preparedness. In conclusion it was found that NECSA has the ability to evaluate and manage an emergency situation on site. However, some work is required to streamline communication between all involved functionaries, and especially communication with the media. This will be rectified through focused drills and exercises.

8. PHYSICAL SECURITY

Following the events of 11 September 2001, directives were issued by the NNR to NECSA as the holder of a nuclear licence to reassess its physical security measures in line with international developments. As a result of these directives, improvements were made to the physical security measures on the NECSA site.

9. INSPECTIONS AND AUDITS

During the reporting period NNR inspectors performed a total of 153 compliance inspections on the NECSA site. These inspections covered all aspects of the licensing conditions. During these inspections the percentage compliance was determined to be 99 percent. Compliance was therefore acceptable.

INCIDENTS / OCCURRENCES

In accordance with the requirements of Licence Document LD-1001, incidents/occurrences are classified as:

- Category 1, where immediate NNR notification is required
- Category 2, where NNR notification is required within 24 hours
- Category 3, where NNR is informed on a quarterly basis

A total of 114 incidents/occurrences were reported during the reporting period. Of the reported incidents/occurrences, 75 were classified as Category 3, 39 were classified as Category 2, and there were no Category 1 occurrences.

In terms of description the 114 incidents/occurrences can be classified as follows:

Table 9

Category – description	Number
200 – Exceeding of investigation level	48
201 – Contamination	7
202 – Releases	0
203 - Explosion / Fire	1
204 – Non-compliance criticality	0
205 – Non-compliances found RP/HSE audit	5
206 – Non-compliance documents	29
207 - Theft, loss of material	0
208 - Other (E.g. Equipment failure, scram, etc.)	24
Total	114

VAALPUTS : NATIONAL RADIOACTIVE WASTE DISPOSAL FACILITY

BACKGROUND

Vaalputs, the National Radioactive Waste Disposal Facility, is situated in the Northern Cape Province, 90 km south-east of Springbok and 200 km from the Namibian border. It is located on the western edge of the Bushmanland Plateau, and extends some way into the Kamiesberg.

The climate is harsh and summer temperatures often exceed 40oC, while freezing conditions and winds with a high chill factor are often experienced in winter. Rainfall is bimodal, with an annual average of less than 100 mm, mainly in the form of thunderstorms.

Sheep farming is the only agricultural activity of any significance in the area. The carrying capacity is extremely low and one sheep per 9 ha is the generally accepted norm. The population density within a radius of 50 km around the site is extremely low, less than one person per square kilometre.

Vaalputs came into operation in 1986 and is used for the disposal of low and intermediate level waste from Koeberg in near-surface trenches. Following emplacement of the waste containers, the trenches are backfilled and capped and the natural vegetation is restored.

SAFETY ASSURANCE

1. Occupational Exposure

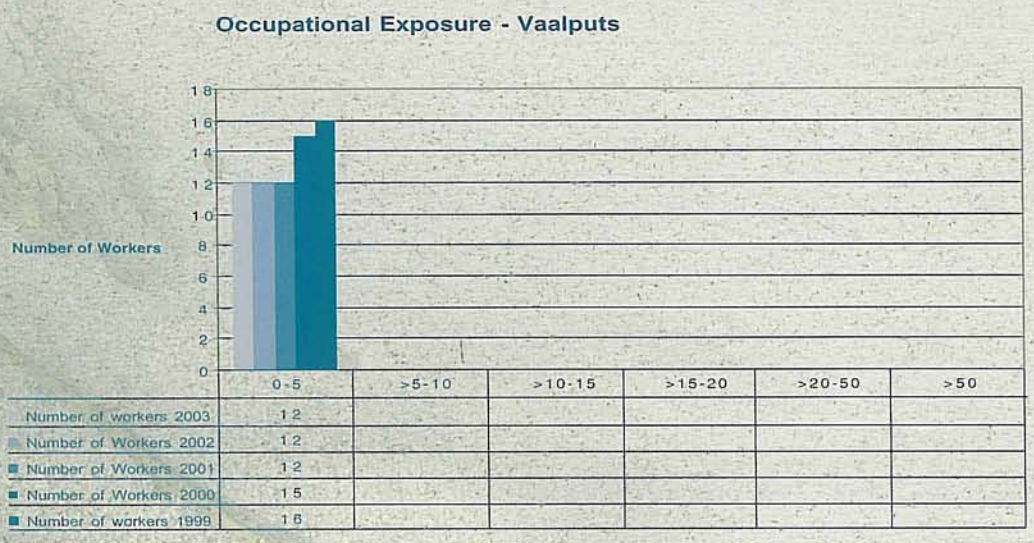
The controls over occupational exposure during the review period were comparable to the best practice internationally. The average effective radiation dose per occupationally exposed worker for 2003 was 0,13 mSv.

Table 10

Maximum Dose ($mSv.a^{-1}$)	0.89
Average Dose ($mSv.a^{-1}$)	0.13
Total Collective Dose (person-Sv)	0.0075

The following figure below details the dose distribution for the past five years.

Figure 5



2. Public Exposure

Based on the environmental surveillance programme it can be concluded that there was no measurable radiological impact on the public living around Vaalputs.

3. Environmental Safety

A routine environmental monitoring programme on and around the Vaalputs site has been in place since 1984. The programme is conducted to confirm that there have not been any releases from the Vaalputs site into the environment. Due to the climate in the area, where the evaporation is about 36 times higher than the rainfall, the monitoring programme is mainly focused on borehole water, soil and vegetation.

Most of the nuclides were below the lower level of detection of the analytical equipment. Detectable concentrations, mainly uranium and alpha and beta activities, were from natural radioactivity. From the environmental monitoring results it can be concluded that no measurable radiological impact from the Vaalputs National Waste Disposal Facility could be detected.

4. Radioactive Waste Safety

There were no safety concerns regarding the safety of waste management at Vaalputs.

5. Inspections and Audits

The NNR undertook inspections and attended a NECSA radiation protection and quality assurance audit at Vaalputs during the reporting period. The inspections and audits concluded that there was adequate compliance with the conditions of licence.

The NNR is involved in the KNPS/NECSA joint working group's meetings. This joint working group is looking to improve waste management systems from design to disposal.

MINING AND MINERAL PROCESSING

BACKGROUND

The Regulation of Natural Sources (RENS) Programme is responsible for the regulation of facilities that possess or handle sources containing naturally occurring radionuclides. Naturally occurring radionuclides are present in most materials, such as mineral ores, tiles, fertilizer, glass, etc. The most common naturally occurring radionuclides in materials are those of the uranium and thorium series and potassium-40. This material is commonly referred to as Naturally Occurring Radioactive Material (NORM). In some materials the levels of naturally occurring radionuclides are significantly higher, to the extent that regulatory control is required for radiation protection purposes. However, in other materials the levels of naturally occurring radionuclides are very low, such that regulatory control is not necessary.

Regulation of NORM presents a range of new challenges for both regulators and operators. Unlike more traditional industries dealing with radionuclides, NORM industries have generally not had any radiological oversight and as such were not equipped or designed for radiological protection at their inception. The lack of appropriate designs for radiological control has thus in some mines resulted in exposure of underground workers above the dose limit. The legacy of a lack of radiation protection in NORM facilities, due largely to inadequate understanding at the time, has also led to the existence of contaminated sites/land throughout the country. The main challenge here is that those originally responsible cannot be easily identified.

To date the National Nuclear Regulator has issued 96 nuclear authorisations to NORM facilities (see table below). Of the 96 nuclear authorisations, 4 were issued during the 2003/2004 financial year. The 4 nuclear authorisations issued during the year were part of 30 applications, of which some were either withdrawn or are being processed.

Authorised Facilities

Mining and Mineral processing	54
Laboratories (Small Users)	28
Service Providers	2
Scrap Recyclers	12
Total	96

Mining and mineral processing facilities cover broadly the production of minerals such as copper, gold, uranium, heavy minerals and phosphate rock. Service providers are all authorised for the clean-up of sites contaminated with NORM residue. Scrap Recyclers are mainly involved in the business of processing and selling scrap materials such as ferrous metal, plastic and stainless steel, all of which are contaminated with NORM residue from the mining processes. Small Users consist of laboratories and pilot plants for conducting the testing of small quantities of NORM samples to verify the viability of proposed mining projects.

In accordance with an approach agreed to by the NNR Board, Chemrad Services cc applied for a nuclear authorisation to undertake the clean-up of the 38 contaminated sites that had previously been identified, and clean-up commenced in July 2003. With the support of the gold mining industry, good progress was achieved. By the end of the reporting period the three sites that contained the highest volume of Category 3 waste (radioactivity concentration above 1000bq/g) had been cleaned up and interim and final close-out reports submitted to the NNR. Additionally, another 12 sites have been cleaned up and surveyed, and the interim close-out reports submitted to the NNR. The final close-out reports are awaited, subject to the analysis results of samples taken at these sites.

Following the recommendations of the working group on the management of scrap, the NNR held a workshop with all the affected stakeholders regarding the management of radioactively contaminated scrap. Following the workshop a Plan of Action was developed to address the comments made during the workshop. A subsequent working group, involving representatives of all the affected stakeholders, will now be established to progress the recommendations as reflected in the Plan of Action.

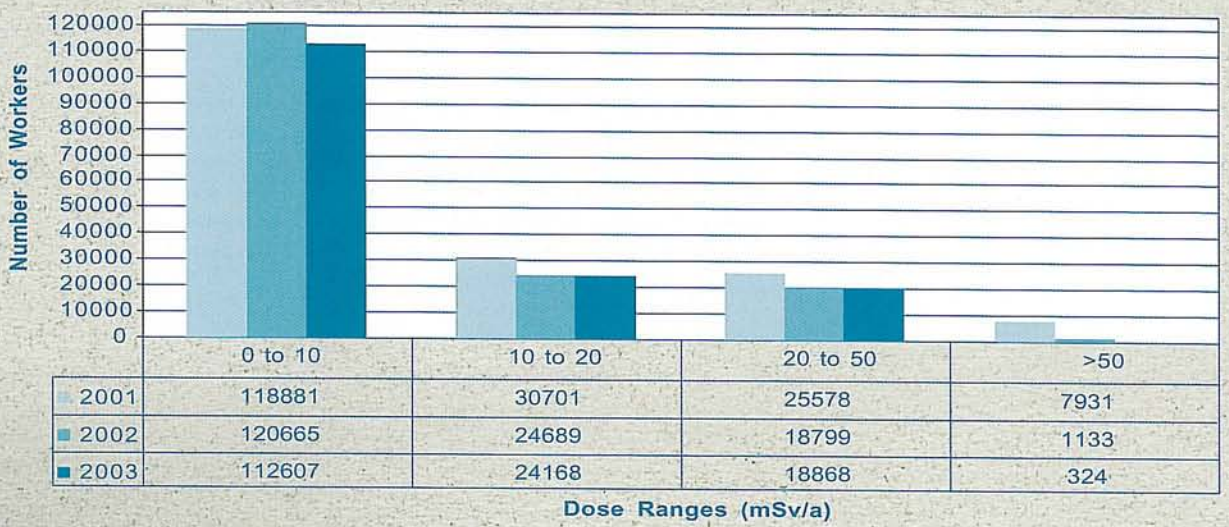
SAFETY ASSURANCE

1. OCCUPATIONAL EXPOSURE

The Regulation of Natural Sources Programme focused much of its regulatory efforts during the reporting period on those mines where the potential exists that workers may be exposed to radiation levels in excess of the dose limit.

Figure 6 below compares the distribution of radiation doses to workers as reported by holders in their annual dose reports for the 2001, 2002 and 2003 calendar years. From the graph it is clear that considerably fewer persons exceeded the dose limit in 2003 than in the previous years. One of the factors that contributed to the improvement was the implementation of more rigorous compliance assurance measures by the NNR during 2002 and 2003 at those mines where dose limits had been exceeded. Working groups have been established at all those mines to monitor progress with the action plans developed by the mines to reduce occupational exposure. Activities of these working groups, which include representatives of the NNR, the mine, workers and the Mine Health and Safety Inspectorate, are ongoing.

Figure 6
Comparison of radiation exposures for 2001, 2002 and 2003



	0 to 10	10 to 20	20 to 50	>50
2001	118881	30701	25578	7931
2002	120665	24689	18799	1133
2003	112607	24168	18868	324

2. PUBLIC EXPOSURE

A working group including representatives of holders has been established to develop a status report on the radiation hazards to members of the public arising from mining and mineral processing facilities. The working group also deals with all the issues pertaining to the development of a status report. Activities of the working group are ongoing. The results show that there is no safety concern.

3. RADIOACTIVE WASTE SAFETY

The table below reflects the disposal of radioactively contaminated waste by mining and minerals processing facilities. The figures below do not include confirmation from some holders of authorisation , and the NNR is following on them.

Table 11

Type of waste	Quantity (Tonnes)
Contaminated scrap metal to authorized dealer or smelter	2 000 000
Material disposed to tailing dams	6 000 000
Category 3 waste stored at the holder	100

Disposal of contaminated wasted

4. TRANSPORT SAFETY

Routine shipments of low specific activity (LSA-1) material are made daily between authorized mines, scrap dealers and smelters, and at least 12 000 shipments took place during the reporting period. No incidences of any significance were reported from any of these shipments.

5. INSPECTIONS AND AUDITS

A total of 110 inspections were conducted to verify the degree of compliance with the various programmes and procedures implemented by the holders. Holders were required to

investigate the reasons for and implement corrective actions related to all the non-compliances identified. These inspections were focused on those mines where worker doses could potentially be exceeded and also on those mines where uranium and acid plants were under demolition.

INCIDENTS / OCCURRENCES

A total of 28 occurrences were reported by holders. Eleven were regarded as Category 1 and related to those mines where workers were exposed to radiation levels that exceeded the annual dose limit of 50mSv during the 2003 calendar year. Three occurrences related to holders that demolished potentially contaminated plant areas without submitting the required safety assessments and radiation protection programmes to the NNR for approval prior to the commencement of the demolition activities. The remainder of the occurrences was of less safety significance.

The RENS programme took part, from a radiation protection point of view, in the Joint Operations Committee responsible for the salvaging of the Sealand Express, the ship that ran ashore at Bloubergstrand near Cape Town. No spillage of radioactive material occurred during the entire salvage operation.

PROSPECTIVE LICENSING AND OTHER PROJECTS

PROPOSED PEBBLE BED MODULAR REACTOR

The proposed Pebble Bed Modular Reactor (PBMR) is a graphite moderated, helium cooled reactor using a direct gas cycle to convert heat, generated by nuclear fission in the reactor (pebble bed reactor core type design) and transferred to the coolant gas, into electrical energy by means of a helium turbo-generator. By design, provision has been made to accommodate the storage of spent fuel in the building for the 40-year design life of the plant and thereafter for a further period if so required. Radioactive material and waste will be managed and disposed of in accordance with regulatory and government legal requirements. Should construction be approved, it is proposed to locate the installation on Eskom property within the owner-controlled perimeter of Koeberg Nuclear Power Station.

During the reporting period the NNR continued to review the nuclear installation licence application submitted by Eskom. The main activities are linked to the resolution of the Key Licensing Issues (KLIs) and safety issues identified during the NNR review of the PBMR safety case. These activities are currently being progressed by 10 working groups (WGs) composed of Eskom and PBMR staff, which requires significant NNR involvement.

In terms of its compliance assurance activities, the NNR performed a Safety Culture Audit on the PBMR Company. The audit was led by TÜV (the German consultant company providing technical support to the NNR for the licensing activities of the PBMR) with NNR staff as auditors and observers. The PBMR Company co-operated fully during the audit. A general observation of the audit was that the Safety Culture in the PBMR Company has improved over the past eighteen months, but some improvement is still required.

The issuing of the nuclear installation licence for the proposed PBMR reactor demonstration plant will be subject to finalisation of the NNR's public hearing process in accordance with the NNR Act and the NNR's satisfactory assessment of the associated Safety Case.

PROPOSED PBMR FUEL PLANT

In July 2000, NECSA submitted an application for a nuclear installation licence for the proposed manufacture of nuclear fuel spheres as well as non-fuel graphite spheres for the proposed Pebble Bed Modular Reactor.

The licence application was published for public comment in the first quarter of 2001. Following a review of the comments received, the NNR Board in terms of section 21(4) of the NNRA determined that there was a need for further public debate. As a consequence it was agreed that a process of public hearings would be held.

The NNR continued to review applicant's safety case documentation during the review period. The issuing of the nuclear licence for the proposed PBMR Fuel Plant will be subject to the finalisation of the NNR's public hearing process and its evaluation of the associated safety case.

PROPOSED PRODUCTION SMELTER AT NECSA

Originating from NECSA's previous operations, approximately 14 000 tons of uranium-contaminated scrap metal is presently stored on the Pelindaba site. The greater portion of this metal consists of about 36 000 separation elements, which, in accordance with non-proliferation agreements, should be destroyed completely. NECSA regards smelting as the most appropriate and cost effective method to achieve this.

The NNR continued to review the applicant's safety case documentation during the reporting period. The issuing of the nuclear licence for the proposed smelter will be subject to the finalisation of the NNR's public hearing process and its evaluation of the associated safety case.

BOREHOLE DISPOSAL INVESTIGATION

The IAEA requested NECSA to undertake a Technical Cooperation (TC) investigation to demonstrate the feasibility of disposing of disused sealed radioactive sources (DSRS) in a borehole. The proposed completion date for this investigation is the end of June 2004.

Since the IAEA specified that the investigation be subjected to a regulatory process, NECSA requested the NNR to participate as a partner in the TC project. The NNR's involvement in this borehole disposal investigation is in terms of Section 7(1)(i) of the National Nuclear Regulator Act.

The use of a generic safety assessment in conducting the site-specific safety assessment is currently under review. Part of the regulatory evaluation of the project is the public perception of such a disposal option. Since it is not a normal licensing project, the NNR Board of Directors accepted an alternative proposal, aiming at a panel discussion to gather all public concerns on the borehole disposal concept. The panel discussion is scheduled to take place in the next reporting period.

STANDARDS AND REGULATORY PRACTICES

SAFETY STANDARDS

During the reporting period the NNR worked closely with the Department of Minerals and Energy (DME) with regard to the drafting and finalization of the document on safety standards and regulatory practice. Accordingly in terms of section 36 of the NNR Act the safety standards were published in the Government Gazette for public comment before promulgation. The NNR is now working with the DME to address the comments in order to finalize the standards.

(ASAM) APPLICATION OF SAFETY ASSESSMENT METHODOLOGIES FOR NEAR-SURFACE RADIOACTIVE WASTE DISPOSAL FACILITIES.

Safety assessment is an important component in evaluating the acceptability of a radioactive waste disposal practice. The ISAM ("Improving Long Term Safety Assessment Methodologies for Near Surface Radioactive Waste Disposal Facilities") project was launched by the IAEA in 1997 and completed in 2000. Upon completion of the ISAM project it was recognised that a need existed to investigate the further application of the ISAM methodology to a range of practical issues.

As a consequence, the IAEA has organised a new and complementary Co-ordinated Research Project (CRP) "Application of Safety Assessment Methodologies for Near-Surface Radioactive Waste Disposal Facilities" (ASAM), which will build on the experience of the ISAM project. The overall objectives of the ASAM project are:

- To explore the practical application of the ISAM methodology to a range of near-surface disposal facilities; and
- To develop practical approaches to assist regulators, operators and other specialists reviewing safety assessments.

The NNR has participated in two working groups of the ASAM project – namely the Mining and Minerals Processing Waste Working Group and the Regulatory Review Working Group.

The expected outcomes of the Mining and Mineral Processing Waste Working Group will be related to the following aspects:

(a) To demonstrate application of the ISAM methodology for evaluation of the long-term safety of near-surface disposal facilities for mining and minerals processing waste;

(b) To develop a list of faults and events that could directly or indirectly influence the disposal system; and

(c) To demonstrate the practical application of the regulatory review procedure.

The Review and Regulatory Aspects Working Group will develop:

(a) a regulatory review procedure that will provide guidance to regulatory authorities, safety assessors, operators and independent reviewers in making decisions on the acceptability of post-closure safety assessments and safety cases of near-surface disposal facilities;

(b) a document advising on the structure and content of a safety case; and

(c) a summary of the findings of the practical application of the ASAM regulatory review procedure within the ASAM project.

IAEA MISSION

The IAEA appointed two NNR employees to an expert mission in Tanzania to assist the Tanzanian regulatory authority, the National Radiation Commission (NRC), to conduct a study of radiation hazards due to NORM in their underground gold, coal and tanzanite mines and thus be able to establish an appropriate radiation monitoring programme in the mining industry.

In order for the NRC to be able to carry out the above-mentioned study in future, its staff members were provided with a theoretical background on the radiation hazards due to NORM that exist in the mining industry, factors to be considered in preparing or planning for an assessment and the use of radon concentration and progeny measuring instrumentation.

NRC staff members were also provided with practical training on the various methods/techniques used for measurements of radon concentrations in mines. This was achieved by visiting four mines, two opencast and two underground mines. It was noted that radon usually constitutes the major radiation hazard in the mining industry and as such the training of the NRC staff concentrated, during the period of this mission, on the assessment of radon and its progeny.

RESEARCH PROJECTS

1. Identification of actions involving naturally-occurring radioactive material in South Africa that needs to be authorised

Various persons are carrying out actions that could be subject to legislation, but who might not be aware thereof and/or have not yet applied for a nuclear authorization. Radioactivity in all its forms, including naturally-occurring radioactivity (NORM) can be hazardous to the environment and human health.

In South Africa, as in other countries, an important principle is that of authorisation of all actions that handle radioactive materials. Certain activities are authorised by the NNR. Many different activities carried out in South Africa involve NORM, with different activity levels. Some of these activities or actions could possibly pose hazards to workers or to the public. This project will therefore study the relationship between the radioactivity levels and the kinds of radioisotopes present in the materials handled in a particular industry and the associated radiation hazard in terms of human exposure. The object is to contribute to the establishment of appropriate criteria for the licensing or authorisation of such actions. The work to develop this methodology is being progressed with the Applied and Environmental Physics Research Programme and the Centre for Postgraduate Studies in Radiation Protection at the University of the Witwatersrand.

Comprehensive criteria to be developed will be used in making a decision as to whether specific activities require formal authorisation. These criteria should not pose a financial burden where the hazard is sufficiently low.

Benefits to the NNR would be to identify the industries, persons and/or actions in South Africa that would be required to fall within the NNRAct and to recommend the extent of assessment required, if any, and to determine the need for authorization of such facilities.

2. Study of indoors/outdoors radon concentration and radioactivity in the environment of the Paarl area

The local municipality and interested parties have expressed concern about the exposure levels to the public in Paarl. Paarl is situated 60 km from Cape Town. Elevated levels of radon and environmental radioactivity have been found in the Paarl region, which accommodates about 140 000 people and is built on the slopes of a hill consisting of granite rocks. The Radiation Section of the Department of Health performed radon measurements at a few sites in Paarl about 10 years ago. Elevated levels were found in some of the older houses with poor ventilation, and a very elevated value (>2000 Bq m-3) was measured in the basement of the NG Church. These measurements were of limited scope and more measurements are needed.

The elevated natural radioactivity could be a safety concern and monitoring is therefore required to obtain more reliable data, which would be compared with the measurements by the DoH 10 years ago. In addition, a survey of the Cango Caves is also included to measure the exposure levels inside the caves. This also arose from public concerns for the workers/tour guides in the caves. Lastly a report will be prepared with results, conclusions and recommendations

LABORATORY AND INSTRUMENTATION

The NNR laboratory was established to conduct routine verification analyses of samples that are collected around authorised facilities such as NECSA, Koeberg Nuclear Power Station and some mines. The reported results from NECSA and Koeberg are compared to those of the NNR laboratory for quality assurance purposes. The laboratory results are transmitted to the programmes, which then use such information to verify compliance by the licensee. About 80 samples of different media were sent to the NNR for the year 2003/04. From the analyses results there are no significant deviations from the NNR requirements in terms of the radioactivity that is released to the environment.

The NNR has acquired a variety of portable radiation monitors, which are used during compliance assurance inspections, verification surveys during clearance of land and in the event of emergencies. The availability of these instruments places the NNR in the best position to determine any deviations from acceptable practices by licensees and to react appropriately during emergencies.

COOPERATIVE AGREEMENTS

BACKGROUND

Section 6(3) of the National Nuclear Regulator Act (Act 47 of 1999) requires regulations to be published on cooperative governance between the NNR and relevant state departments. The Minister of Minerals and Energy published these regulations as Gazette No 23428, Notice no 709 of 24 May 2002. These were published in consultation with the various ministers including Minister of Health, Environmental Affairs & Tourism, Water Affairs & Forestry, Labour, and Transport. Responsibility for the conclusion of co-operative agreements lies on the NNR act (section 2).

Benefits of the agreements and the Process

The purpose of the cooperative agreement is to provide for a mechanism to deal with issues of cross-jurisdiction between the NNR and the relevant government departments. Cooperative governance agreements between the NNR and the relevant government departments are thus essential, amongst other factors in executing duties and responsibilities to its maximum ability and in minimizing the duplication of such functions.

Current Status

Three cooperative agreements with the Department of Minerals and Energy- Mine Health and Safety Inspectorate, Department of Minerals and Energy- Electricity & Nuclear and Department of Health- Directorate Radiation Control were published for public comment and are in the process of being finalized. Two further agreements with Department of Labour and the Department of Water Affairs & Forestry are ready to be published shortly in the gazette for public comment.

The Department of transport was contacted during this reporting period and the NNR was informed that there are four agencies within the Department of Transport and it was recommended that separate cooperative governance agreements be concluded with each of these agencies.

Negotiations to facilitate these agreements with the Civil Aviation Authority, the South African Marine Safety Authority, the Roads agency and the Railways Safety Regulator are been actively pursued. Draft Agreements with Department of Mineral and Energy -Mineral Development and Department of Environment and Tourism are with the counterparts and are to be signed in the near future.

IAEA ACTIVITIES

INTRODUCTION

The IAEA has established a framework of internationally agreed standards on nuclear safety, radiation protection, transport and radioactive waste safety and a number of mechanisms for their application, such as peer reviews, technical assistance, exchange of scientific and technical information on the peaceful use of atomic energy, training and research and development.

Publications of a regulatory nature by which the IAEA establishes safety standards and measures are issued in the IAEA's Safety Standard Series. The safety standards are not binding on the Member States but may be adopted by Member States for use in national regulations. Some of these safety standards are used by the NNR as standards currently in compiling NNR standards. The NNR has representation on three of the four safety committees of the IAEA. The reports are detailed below. The fourth committee, the Radiation Safety Standards Committee (RASSC), includes a representative from the Department of Health.

In general, the functions of the IAEA Safety Standards Committee, NUSSC, TRANSSC and WASSC are:

- To recommend the terms of reference of all standards in the IAEA's safety standards programme in order to promote coherence and consistency among the standards
- To agree on the texts of Safety Fundamentals and Requirements to be submitted to the Board of Governors for approval;
- To provide advice and guidance on a continuous programme for reviewing and revising the IAEA's safety standards;
- To provide advice and guidance on safety standards, relevant regulatory issues and activities for supporting the application of the Agency's safety standards.

During the annual reporting period, documents at various stages in the review cycle were submitted for review and comment to the committee members. The NNR commented on a number of these documents.

The Waste Safety Standards Committee (WASSC)

Mr T Pather of the NNR, representing South Africa, attended two meetings of WASSC during the reporting period.

The following documents were approved by WASSC for submission to the Commission on Safety Standards for endorsement of publication by the IAEA:

1. DS161 Application of the Concepts of Exclusion, Exemption and Clearance
2. DS62 Strategy for Environmental and Source Monitoring for Public Protection Purposes
3. DS313 Radiation Protection Aspects of Design for Nuclear Power Plants

Transport Safety Standards Committee (TRANSSC)

Dr K Jutle, the South African representative on the Transport Safety Standards Committee, attended the TRANSSC meeting during this reporting period.

TRANSSC-endorsed revisions to the Transport Regulations were proposed for publication as an amended version in 2003. Reviews of the status of transport safety publications, databases, co-ordinated research projects, transport safety appraisals, training and public information products were discussed at the meeting. Reports from Member States and involved international organisations were discussed with a view to defining issues where further actions were required towards harmonisation of the application of the Transport Regulations.

TRANSSC VIII recommended that the Secretariat resolve the comments and proceed to publish the Provisional Safety Guide on Radiation Protection Programmes for the Transport of Radioactive Material

The NNR attended the transport conference organised by the IAEA in Vienna in July 2003. The objective of the conference was to foster the exchange of information related to transport. The report on a Coordinated Research Project in which South Africa participated was presented at the conference.

Nuclear Safety Standards Committee (NUSSC)

The NUSSC is responsible, in conjunction with the other safety committees, to identify and advise on any necessary activities in support of the nuclear safety programme. An Action Plan for the development and application of the IAEA safety standards was approved by the IAEA Board of Governors. One of the actions of the Action Plan is to complete the development of a corpus of thematic and facility specific safety standards. During the annual reporting period twenty documents, at various stages in the review cycle, were submitted for review and comment to the NUSSC committee members. The NNR commented on a number of these documents. Six new safety standards (four safety guides and two requirement documents) were endorsed by NUSSC to be issued to the Commission on Safety Standards for publication. The following documents were approved for publication:

1. Site Evaluations of Nuclear Power Plants
2. Safety of Research Reactors
3. Design of Reactor Containment Systems in Nuclear Power Plants
4. Protection Against Internal Hazards (other than fire and explosions)
5. Reactor Core Design in Nuclear Power Plants
6. Format and Content of Safety Analysis Report

COMMUNICATIONS AND OUTREACH INITIATIVE

KOEBERG ENVIRONMENT DEVELOPMENT COMMITTEE (KEDC)

Four meetings of the Koeberg Environs Development Committee (KEDC) were held in Cape Town over the reporting period. Present and future developments in the vicinity of Koeberg, including the assessment and control thereof to assure that the Koeberg emergency plan remains viable were discussed at these meetings. The main issues discussed and accepted in this forum were the regulation (No. 287) on developments around nuclear installations, and its implications in terms of the type of assessment process to be applied to such developments (refer to section 8.4).

KOEBERG EMERGENCY PLANNING LIAISON COMMITTEE (EPLC)

Four meeting of the EPLC were held in Cape Town. Issues relating to disaster management legislation, cooperative governance and progress in the various forums relating to the Koeberg emergency plan were discussed. In view of the close linkage between urban development and the Koeberg emergency plan, and for efficiency, the EPLC and KEDC have recently been merged into one forum. In view of the close linkage between urban development and the Koeberg emergency plan, and for efficiency, the EPLC and KEDC have recently been merged into one forum. The purpose of this forum will be to provide oversight on compliance with regulations pertaining to the Koeberg Emergency Plan and regional developments which impact on it . The main outcomes of the EPLC meetings to date could be considered to be the initiation of the development of the late phase aspects of the Koeberg emergency plan (section 8.5), reporting and follow-up on emergency exercises (section 8.1), follow up on specific international issues such as intervention levels for the distribution of potassium iodate pills (section 8.6) and environmental issues such as the concern relating to the possible presence of Strontium-90 at the Vissershok site (section 10).

MEETING BETWEEN THE NNR AND LABOUR UNIONS AT KOEBERG

Four meetings were held with representatives of the various unions at Koeberg (namely MWU, EEA, NUM, NUMSA) during the reporting period. The main items of discussion were as follows:

- The way forward in terms of liaison between the NNR and the Atlantis community, and public communication generally.
- Concerns regarding emergency planning such as the provision of transport for the evacuation of plant personnel, the public address system at mustering points, and union representation as observers.

PUBLIC PARTICIPATION IN THE PBMR LICENSING PROCESS

The NNR Act makes provision for public participation in the licensing process connected with the application. In terms of the PBMR licence application, the NNR Board decided that, based on the public representations made to the NNR following the publication and serving of the licence application in January 2001, public hearings would take place following a positive Record of Decision (ROD) from the Environmental Impact Assessment (EIA) and once the revised PBMR safety case in support of the application for the licence has been submitted to the NNR and after the NNR has also undertaken an initial review.

In terms of the plan prepared by the NNR for conducting the public hearings, the public will be notified and provided with information well in advance of the public hearings.

INTERNATIONAL CO-OPERATION AND LIAISON

Bilateral meetings took place over the period 8-12 September 2003 with the French and Belgian regulators (DGSNR and AVN respectively) in France and in Belgium. A discussion document on severe accident issues was prepared and submitted to the DGSNR and AVN with a view to the NNR obtaining assistance in the assessment of severe accident modifications designed to mitigate the consequences of severe accidents at Koeberg, as well as the technical basis of the emergency plan . A wide range of safety issues relating to power

reactors and research reactors was discussed at these meetings. The meetings with the AVN helped to resolve technical questions regarding the application by Koeberg to use higher burnup and more highly enriched fuel in Cycle 213 and future cycles. At the request of the DGSNR, the NNR prepared an article on the use of Probabilistic Risk Assessment in the regulatory process, which was published in the November 2003 issue of "Controle", a monthly report produced by the DGSNR.

The NNR was invited to attend a meeting of the board of INPO (Institute of Nuclear Plant Operators) which took place on 19 Nov 2003. The meeting was attended by the NNR's CEO, Adv Louisa Zondo, and Mr Peter Bester. The visit included a meeting with the US-NRC to help the NNR establish the implications of Eskom having INPO accreditation for the training of Koeberg operators.

Mr Chris Beyers attended the Joint NEA/IAEA Meeting to Exchange Information on Recent Events in Nuclear Power Plants and the Technical Committee Annual Meeting of Incident Reporting System (IRS) National Co-ordinators in Paris during October 2003. He prepared and presented a paper entitled "Increased Risk to Koeberg NPP Unit 2 as a Result of Degraded 6,6 kV Breakers and Failure of Two Diesel Generators on Demand".

Dr T Hill attended the IAEA INSAG meetings (International Nuclear Safety Group) held in November 2003 and April 2004 at the IAEA, Vienna.

Mr G A Clapisson attended an IAEA Consultancy Meeting on "Regulatory Aspects of the International Project on Innovative Nuclear Reactors and Fuel Cycles" (INPRO) at the IAEA Headquarters in Vienna, Austria from 14-16 January 2004

Mr G A Clapisson attended a Task Force Meeting in Cairo (Egypt) from 20-24 March 2004 to prepare guidelines and indicators of sustainability for regulatory authorities/institutions under the AFRA V-2 (RAF/0/014) project.

Dr A S Tsela participated in the meeting of NERS (Network of Regulators with Small Nuclear Programmes) held in Budapest, Hungary 22-25 September 2003 The focus of NERS is to share experience and provide support amongst NERS members. The particular meeting focussed on the following issues:

- Ways of maintaining corporate knowledge within the regulatory body
- Regulatory control of the use of contractors by operating organisations, and of the use of TSOs (technical support organizations) for regulatory decision making processes
- Presentation and discussion on the results and recommendations made by the IAEA peer-review mission requested by the Hungarian Government for the INES-3 events and its investigation
- Quality Management System in Regulatory Bodies

The NNR concluded a Memorandum of Understanding with the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). The memorandum has scope with respect to the regulation of nuclear research reactors, radioactive waste and aspects related to naturally-occurring radioactive material (NORM), including radon, research and development and exchange programmes (capacity building).

ORGANIZATIONAL STRUCTURE OF THE NNR

THE NNR'S ORGANIZATIONAL STRUCTURE IS CONSTITUTED OF THE FOLLOWING CORE GROUPS:

(a) Power Reactor Division
(b) Nuclear Technology and Natural Sources Division
(c) Assessment Group
(d) Regulatory Strategy Development Division
(e) Corporate Support Service Division

PERSONNEL STRUCTURE

Staff Category

Chief Executive Officer	1
Senior Management	4
Programme or Departmental Management	8
Process /Functional Sub-group Coordination	9
Regulatory Officials and Specialists (all levels)	31
Administrative, Secretarial and Support staff	21
TOTAL	74

EMPLOYMENT EQUITY

Representivity - total staff

a) Total NNR composition

White males	26	(35.10%)
Black males	24	(32.40%)
White females	12	(16.20%)
Black females	12	(16.20%)

Included are 2 disabled permanent employees.

b) Composition of Staff by Race

c) Composition of Staff by Gender

Figure 7:
Composition of Staff by Race

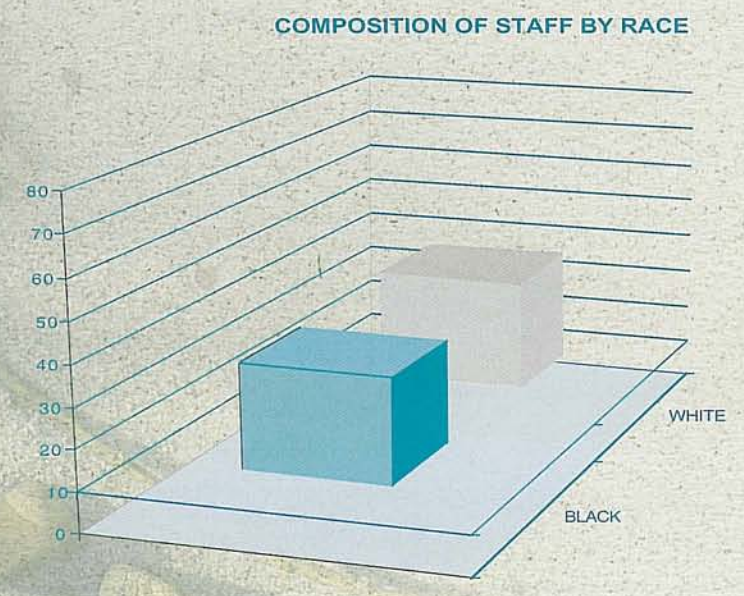
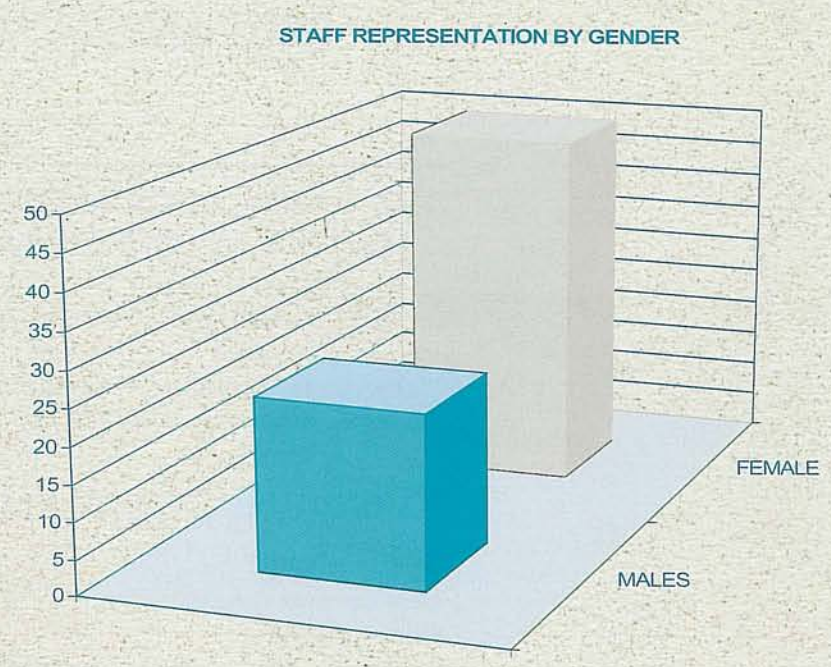


Figure 8:
Composition of Staff by Gender



d) Management

Top management		
White males	1	(20%)
Black males	3	(60%)
White females	0	(0%)
Black females	1	(20%)
Senior Management		
White males	3	(37.5%
Black males	3	(37.5%
White females	0	(0%)
Black females	2	(25%)
Total	8	
(Disabled included in the eight senior management level)	2	(25%)

CAPACITY BUILDING

The continual ageing of the existing workforce, the growing pressures that are exerted on the viability of the future of nuclear power in many countries, including South Africa, the previous exclusion of other population groups from participating in the nuclear power professions and the apparent lack of interest in new professionals from designated groups in engaging in the nuclear field, represents a capacity building and development constraint for the NNR. In order to respond to this challenge the NNR has put in place various capacity building interventions.

Staff Qualifications

Qualifications	*Number of staff*
Doctorate	7
Masters	19
Honours	13
Baccalaureate Bachelors Degree	12
Diploma	10
Matric	12
Sub-matric	1
TOTAL	74

STAFF TRAINING AND DEVELOPMENT

The success of the NNR depends on well-trained, effective employees. As a result it regards the training and development of staff in a very serious light and this is why it has allocated approximately 2.87% of its personnel budget to staff training and development. Priorities in allocating resources to training and development gave specific emphasis to the accelerated training of staff from the designated groups.

To achieve this objective, for example, the NNR, participated in an initiative introduced by the Minister of Minerals and Energy for the purpose of supporting human resource devel-

opment in the nuclear field in a partnership involving AREVA (France) and South African entities, NECSA, NNR, ESKOM and the PBMR Company. Eighteen NNR employees were trained through this programme during the reporting period in the following areas:

Training 1 - Reactor Safety Analysis, Neutronics and Accidents (6 June - 4 July 2003)
Training 2 - Accident Analysis Simulation Codes (6 October - 29 November 2003)
Training 3 - Dose assessment/Methodology and Models - European Radiation Protection (November 2003 - February 2004)

BURSARY SCHEME

In order to develop skills outside of the organisation to prepare the industry for succession and the replacement of departing expertise, the NNR provided bursaries to five students during the reporting period. All the bursaries were granted to students from the previously disadvantaged group. Bursaries were allocated as follows:

1) Civil engineering	(1 x University of Cape Town)
2) Radiation Science	(4 x University of North West)

INTERNSHIP PROGRAMME

The internship programme is termed NYALUSO (a Venda word for development). The main purpose of this programme is to provide learners with a nuclear energy safety regulation and protection-based learning experience that combines structured learning with on-the-job experience, thereby integrating learning with real-life working experience. The programme will help learners to acquire the experience and skills they need to enter and duly participate in the labour market.

The National Nuclear Regulator uses this programme to contribute to the creation of national skills pool in nuclear regulation and control matters in South Africa. Three interns were accepted into the programme, and attended modules in the Framatome Training Programme in France.

UNIVERSITY INVOLVEMENT

Post-graduate course in nuclear safety

The NNR continued its support of the post-graduate course in nuclear safety at the University of the Witwatersrand. The course was aimed mainly at training staff for work on the PBMR project. It is developed and presented by the NNR, NECSA, Eskom and the Pebble Bed Modular Reactor Company, and facilitated through the University of the Witwatersrand. The Course is due to begin in July 2004, and will be conducted in Cape Town.

Post-graduate course in radiation science (University of North West)

The NNR continued to provide technical and administrative support to the post-graduate course in radiation science at the University of North West. NNR staff provided lectures, training material and supervision of post-graduate students in support of the course.

TRANSFORMATION POLICY AND PLAN

Over the past year, the NNR has focused on making changes to improve every aspect of the organisation's business. The focus has been on making changes within the framework of current legislation. Steady progress has been made toward transformation priorities and the organisation has now prepared the groundwork for long term reforms in the way it performs its work.

- Improvement of Service Delivery and Standards has seen progress. The NNR has customised the Balanced Scorecard as an organisational performance system.
- The alignment of Workplace Policies and Procedures with Democratic Values has been progressed ..
- The establishment of equity has led to the development of an Employment Equity Policy and Plan and Preferential Procurement Policy.
- The building of capacity has been accelerated as stated above. NNR commitment to staff consultation and participation continues.
- There are two unions (Staff Association and NEHAWU), and several human resource committees in which staff participate, e.g. the Training and Development, HIV/AIDS and Employment Equity Monitoring Committees.

The Transformation Policy and Plan that was developed in 2001 remains relevant and continues to be implemented. It has been used to inform the direction of the NNR's Strategic Plan for 2004/5.

STATEMENT OF RESPONSIBILITY

The Public Finance Management Act, 1999 (Act No. 1 of 1999), as amended, requires the directors to ensure that the entity keeps full and proper records of its financial affairs. The annual financial statements fairly present the state of affairs of the National Nuclear Regulator, its financial results, its performance against predetermined objectives and its financial position at the end of the year in terms of the Statements of Generally Accepted Accounting Practice.

The annual financial statements are the responsibility of the directors. The external auditors are responsible for independently auditing and reporting on the financial statements. The Office of the Auditor-General has audited the financial statements and the Auditor-General's report appears on page 58.

The annual financial statements have been prepared in accordance with Statements of Generally Accepted Accounting Practice. These annual financial statements are based on appropriate accounting policies, supported by reasonable and prudent judgments and estimates.

The directors have reviewed the National Nuclear Regulator's budgets and cash flow forecasts for the year ending 31 March 2005. On the basis of this review, and in view of the current financial position and existing borrowing facilities, the directors have every reason to believe, and the auditors concur, that the National Nuclear Regulator will be a going concern in the year ahead and have continued to adopt the going concern basis in preparing the financial statements.

The board of directors sets standards and monitors the implementation of systems of internal control and risk management that are designed to provide reasonable, but not absolute assurance against material misstatements and losses. The National Nuclear Regulator maintains internal financial controls to provide assurance regarding:

- The safeguarding of assets against unauthorized use or disposition
- The maintenance of proper accounting records and the reliability of financial information used within the business or for publication.

The directors have reviewed the entity's systems of internal control and risk management for the period from 1st April 2003 to 31 March 2004. The directors are of the opinion that the Regulator's systems of internal control and risk management were effective for the period under review.

In the opinion of the directors, based on the information available to date, the annual financial statements fairly present the financial position of National Nuclear Regulator at 31 March 2004 and the results of its operations and cash flow information for the year.

The annual financial statements for the year ended 31 March 2004, set out on pages 82-96, were approved by the Accounting Authority in terms of section 51(1)(f) of the Public Finance Management Act, 1999 (Act No. 1 of 1999), as amended, on 28 May 2004, and are signed on its behalf by:

K BHARUTH-RAM
Chairperson

LB ZONDO
Chief Executive Officer

AUDITOR-GENERAL

REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE FINANCIAL STATEMENTS OF THE NATIONAL NUCLEAR REGULATOR (NNR) FOR THE YEAR ENDED 31 MARCH 2004

1. AUDIT ASSIGNMENT

The financial statements as set out on pages 41 to 44 and 53 to 67, for the year ended 31 March 2004, have been audited in terms of section 188 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996), read with sections 3 and 5 of the Auditor-General Act, 1995 (Act No. 12 of 1995) and section 17(8) of the National Nuclear Regulator Act, 1999 (Act No.47 of 1999). These financial statements, the maintenance of effective control measures and compliance with relevant laws and regulations are the responsibility of the accounting authority. My responsibility is to express an opinion on these financial statements, based on the audit.

2. NATURE AND SCOPE

2.1 Audit of financial statements

The audit was conducted in accordance with statements of South African Auditing Standards. Those standards require that I plan and perform the audit to obtain reasonable assurance that the financial statements are free of material misstatement.

An audit includes:

- examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements,
- assessing the accounting principles used and significant estimates made by management, and
- evaluating the overall financial statement presentation.

Furthermore, an audit includes an examination, on a test basis, of evidence supporting compliance in all material respects with the relevant laws and regulations which came to my attention and are applicable to financial matters.

I believe that the audit provides a reasonable basis for my opinion.

3. AUDIT OPINION

In my opinion, the financial statements fairly present, in all material respects, the financial position of the National Nuclear Regulator at 31 March 2004 and the results of its operations and cash flows for the year then ended, in accordance with prescribed accounting practice and in the manner required by the Public Finance Management Act, 1999 (Act No 1 of 1999) [PFMA].

4. EMPHASIS OF MATTER

Without qualifying the audit opinion expressed above, attention is drawn to the following matters:

4.1 Compliance with the Public Finance and Management Act, 1999 (Act No. 1 of 1999) (PFMA) and Treasury Regulations (TR)

The following matters regarding non-compliance with the requirements of the PFMA and TR were noted:

- Section 51(1)(a)(i) of the Public Finance Management Act, 1999 (Act no. 1 of 1999) [PFMA] requires that an entity has and maintains effective and efficient systems of internal control. The NNR has not fully complied with this requirement especially as regards debtors, creditors and the administration of leave and employee benefits.
- The NNR did not apply effective cash management principles as required by TR 31.1.1 as surplus funds were not economically invested partly due to delays in approvals by Treasury.

4.2 Going concern

As reported in the previous financial year and with reference to note 5 to the financial statements, although the NNR recorded a net surplus of R3 354 722 [2003 : R1 036 249] for the year, total liabilities exceeded total assets by R1 485 725 as at 31 March 2004 (2003 R4 840 447).

5. APPRECIATION

The assistance rendered by the staff of the National Nuclear Regulator during the audit is sincerely appreciated.

S Petzer
***for* Auditor-General**

Pretoria
29 July 2004

REPORT OF THE AUDIT AND RISK COMMITTEE FOR THE YEAR ENDED 31 MARCH 2004

The Audit and Risk Committee has adopted appropriate formal terms of reference, which have been confirmed by the Board, and has satisfied its responsibilities as set out in the terms of reference.

In performing its responsibilities the Audit and Risk Committee has reviewed the following:

- the effectiveness of the internal control systems;
- the effectiveness of internal audit;
- the output of a risk assessment workshop to identify the major risks faced by the organisation;
- the risk areas of the entity's operations to be covered in the scope of internal and external audits;
- the adequacy, reliability and accuracy of financial information provided to management;
- the accounting or auditing concerns identified as a result of the internal or external audits;
- the adequacy of policies and procedures considered necessary to comply with the requirements of the Public Finance Management Act;
- the entity's compliance with legal and regulatory provisions;
- the activities of the internal audit function, including its annual work programme, co-ordination with the external auditors, the reports of significant investigations and the responses of management to specific recommendations;
- the adequacy of the terms of reference of the audit committee as well as other Board Committees;
- the scope and results of the external audit, and its cost effectiveness.

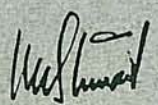
The Audit and Risk Committee has also been responsible for;

- approving the internal audit charter and work plan;
- ensuring adequate segregation between non-audit services and the internal audit function, where these services were provided by the same accounting firm;
- an investigation by the internal auditors into the staff remuneration records and arrangements in place within the organisation;
- encouraging improved coordination and liaison between board committees in those areas where their responsibilities overlap.

The Audit and Risk Committee notes that some of the internal controls and systems that have been put in place have not been fully effective during the period under review. Appropriate action has been planned to address these aspects, which are referred to in the Auditor-General's Report. The Audit Committee nevertheless considers that the system of internal controls have ensured that the organisation's major risks have been reduced to an acceptable level.

The Audit and Risk Committee has evaluated the annual financial statements of the National Nuclear Regulator for the year ended 31 March 2004 and concluded that they comply, in all material respects, to the requirements of the Companies Act (Act 61 of 1973, as amended), the Public Finance Management Act (Act 1 of 1999, as amended) and South African Statements of Generally Accepted Accounting Practice. However the audit committee wishes to note that the basis for reflecting the organisation's liability for retired staff medical aid benefits continues to require further investigation.

Subject to the reservation in relation to medical aid benefits, and the explanation provided in the notes to the annual financial statements, the Audit and Risk Committee concurs with the going concern premise in preparing the annual financial statements, and has recommended their adoption by the Board of Directors.



Chairperson
23 July 2004

Committee members:
Dr JM Stewart (Chairperson)
Ms T Mashanda – from 4 Nov 2003
Adv B Mkhize - from 4 Nov 2003
Mr B Hawksworth - from 4 Nov 2003
Mr EB Mathebula – to 31 Aug 2003
Ms T Zungu – to 31 Aug 2003
Mr J Bone – to 31 Aug 2003

DIRECTORS' REPORT

INTRODUCTION

The directors present their annual report that forms part of the audited annual financial statements of the organisation for the year ended 31 March 2004.

The National Nuclear Regulator is listed as a national public entity in Schedule 3 Part A of the Public Finance Management Act, (Act 1 of 1999, as amended) (PFMA). It was established in terms of Section 3 of the National Nuclear Regulator Act, (Act No 47 of 1999) to:

a) Provide for the protection of persons, property and the environment against nuclear damage through the establishment of safety standards and regulatory practices;

b) Exercise regulatory control related to safety over –

   i) the siting, design, construction, operation, manufacture of component parts, and the decontamination, decommissioning and closure of nuclear installations; and

   ii) vessels propelled by nuclear power or having radioactive material on board which is capable of causing nuclear damage, through the granting of nuclear authorisations;

c) Exercise regulatory control over other actions to which the Act applies, through the granting of nuclear authorisations;

d) Provide assurance of compliance with the conditions of nuclear authorisations through the implementation of a system of compliance inspections; and

e) Fulfil national obligations in respect of international legal instruments concerning nuclear safety; and

f) Ensure that provisions for nuclear emergency planning are in place.

The Board of Directors is the accounting authority in terms of the PFMA.

BOARD OF DIRECTORS

Non-Executive Directors

1 April 2003 – 31 August 2003	1 September 2003 – 31 March 2004
Mr G Aboobaker	Mr G Aboobaker
Prof K Bharuth-Ram (Acting Chairperson)	Prof K Bharuth-Ram (Chairperson)
Dr S W P de Waal	Dr S W P de Waal
Mr D Elbrecht	Mr D Elbrecht
Mr RC Lockwood	Mr RC Lockwood – resigned in November 2003
Mr EB Mathebula	Ms T Mgoduso (Deputy Chairperson)
Ms EK Mohammed	Adv B Mkhize
Mr AHCH Motaung	Mr AHCH Motaung
Dr JM Stewart	Dr JM Stewart
Prof SH Taole	Dr JM Matjila
	Dr T Lesoli
	Ms T Mashanda

Executive Directors

Adv LB Zondo (Chief Executive Officer)

Alternate Directors

Ms T N Zungu (alternate for Dr S W P de Waal) and Ms T Kumalo (alternate for Dr J M Matjila) were appointed from the Department of Minerals and Energy and the Department of Environmental Affairs and Tourism, respectively.

GOVERNANCE

1. BOARD OF DIRECTORS

The membership of the Board is detailed in the section at the beginning of this report.

Board Subcommittees

The board subcommittees during 2003/4 were as follows

Audit and Risk Management Committee

Chairperson

Mr J M Stewart

Members

Mr B Hawksworth

Ms T N Mashanda

Mr B M Mkhize

Finance Committee

Chairperson

Ms T N Mashanda

Members

Mr D P Elbrecht

Ms T N Zungu

Transformation and Development Committee

Chairperson

Ms T N Mgoduso

Members

Mr M G Aboobaker

Dr T Lesoli

Mr B M Mkhize

Mr H Motaung

Directors	Board	Audit And Risk Management Committee	Finance Committee	Transformation and Development Committee
Number of meetings	7 (3 for the 1st Board)	3 (2 for the 1st Board)	5 (3 special meetings)	4 (2 for the 1st Board)
Directors	**Number of Board and committee meetings attended per director**			
G Aboobaker	4	-	-	
K Bharuth - Ram	6	-	-	1
S W P de Waal	4	-	-	1
D P Elbrecht	4	-	5	-
T Kumalo* (Alternate)	3	-	-	-
T Lesoli*	4	-	-	2
R C Lockwood[1]	2	-	-	2
T Mashanda*	4	1	5	-
E B Mathebula[2]	2	-	-	-
J Matjil*	2	-	-	-
T Mgoduso*	3	-	-	2
B M Mkhize*	4	1	-	2
E K Mohamed[3]	3	-	-	1
H Motaung	5	-	-	1
J M Stewart	6	3	-	-
S H Taole[4]	2	-	-	2
L Zondo	7	3	5	4
T Zungu	5	2	5	-

(Footnotes)

1 *R Lockwood resigned from the Board in November 2003*

2 *B Mathebula's term of office ended on 31 August 2003*

3 *E K Mohamed's term of office ended on 31 August 2003*

4 *S H Taole's term of office ended on 31 August 2003*

* *These directors' term of office started on 01 September 2003, on inauguration of the 2nd NNR Board of Directors.*

2 ORGANISATIONAL STRUCTURE

The National Nuclear Regulator is accountable to the Minister of Minerals and Energy, who, in terms of the PFMA, is the executive authority.

3 OPERATING RESULTS

The operating surplus of R2,5 million for the year is mainly due to the savings in personnel expenditure related to unfilled posts.

4 REVIEW OF OPERATIONS

The total income for the NNR is R48,70 million (2003: R44,55 million) including the Government Grant of R7,61 million (2003: R7,28 million) and the operating costs amount to R46.13 million (2003:R44, 28million).

5 PRINCIPAL ACTIVITIES

The NNR carries out effective regulatory control by developing and implementing regulatory standards and practices that are comparable to internationally accepted standards and practices. Quantitative and qualitative assessment techniques and safety assurance programmes are applied in an efficient and cost-effective manner.

In the course of implementing its mandate, the NNR maintained focus on its transformation objectives, which are captured in the NNR Strategic Plan. In this regard, the Report on Performance Against Objectives, below, reflects NNR performance relating to core business, alignment of internal processes to strategy, improvement of stakeholder relations, as well as training and capacity development, employment equity, and preferential procurement.

6 EVENTS SUBSEQUENT TO BALANCE SHEET DATE

The NNR directors are not aware of any matter or circumstance which may have arisen since the end of the financial year, not otherwise dealt with in the annual financial statements, which significantly affects the position of the organisation or the results of its operations

7 MATERIALITY AND SIGNIFICANT FRAMEWORK

A materiality and significant framework has been developed for reporting losses through criminal conduct and irregular, fruitless and wasteful expenditure, as well as for significant transactions envisaged per section 54(2) of the PFMA that requires ministerial approval. The framework was finalised after consultation with the external auditors and has been forwarded to the executive authority for approval. A materiality and significant framework of R300 000 has been recommended for approval by the executive authority.

8 STAKEHOLDER RELATIONS

Through interaction at meetings and forums, the NNR maintained good relations with stakeholders, including the regulated industry (Minerals, Energy and Allied Industries Forum on Radiation), policy/decision makers (the Parliamentary Portfolio Committee on Minerals and Energy, the DME) and organised labour. The NNR also maintained relations with other strategic cooperatives such as the media, Non Governmental Organizations (NGO's), international organizations, nuclear regulatory authorities in other countries, and the general public.

During the reporting period, the NNR commissioned an independent stakeholder survey and the results of the survey have been incorporated into the Communications Strategy of the NNR.

9 SHAREHOLDER RELATIONS

The NNR reported and discussed with the Executive Authority significant events. The major events included: the monitoring of safety in regard to a cargo vessel, "Sealander Express" which ran around off the Cape shore and was carrying radioactive materials as part of its cargo; as well as a preliminary NNR investigation into the keeping of medical records of radiation workers at the Koeberg Nuclear Power Station and the communication of medical information to radiation workers. The NNR interacted with the DME in regard to the National Radioactive Waste Management Policy and Strategy, and the publication of regulations in terms of the National Nuclear Regulator Act.

In regard to the interpretation of the NNR Act's definition of a nuclear installation site with specific reference to NECSA, which was discussed with the DME in the previous reporting period, NNR staff continued with the preparation of recommendations that deal with the complexities associated with this issue, for submission to the Board.

10 SOCIAL RESPONSIBILITY AND CAPACITY BUILDING

During the reporting period the NNR continued its involvement in capacity building initiatives aimed at promoting the entry of young persons and historically disadvantaged individuals into careers in science, in particular, nuclear-related fields. The NNR was also actively involved in an initiative of the Department of Minerals and Energy to establish an association called, Women in Nuclear: South Africa, to advance the empowerment of women within nuclear-related career fields as well as encourage girl children to pursue careers in the fields of science and technology.

The NNR actively participated in national nuclear capacity building initiatives, and sent NNR staff, interns and the students for nuclear-related training courses in France. The training courses were conducted under the auspices of the French nuclear company; Framatome.

11 ADDRESSES

The business addresses of the National Nuclear Regulator are as follows:

Physical address:	Second Floor, Block A Old Mutual Centre Embankment Road Centurion 0046
Email:	nnr@nnr.co.za
Postal address:	PO Box 7106 Centurion 0046
Telephone:	(012) 674 7100
Fascimile:	(012) 663 5513

REPORT ON PERFORMANCE AGAINST OBJECTIVES

The assessment of NNR business performance against objectives is contained in the tables below:

A. CORE BUSINESS

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
1. To review and authorise (or otherwise) new actions and to review and approve (or otherwise) changes to existing actions	A plan for each programme	Plan for each program	Plan for each program	Achieved	Each programme has a detailed operational plan which includes the review and authorisation of new actions as well as changes to existing actions
	Public dose (Limit – 1mSv/a)	RENS Compile baseline report of public doses resulting from facilities authorised by RENS	Database to capture information has been designed and tested for water, fish, dust and radon calculations	Not Achieved	Delays resulted from problems with the formatting of calculations in respect of data captured from 19 Public Hazard Assessment Reports. The problems have been resolved.
		NECSA NNR ALARA target of <0.050 mSv/a	0.021 mSv/a	Achieved	
		Vaalputs NNR ALARA target of <0.005 mSv/a	0. 00 mSv/a	Achieved	
		KNPS NNR ALARA Target of <0.006 mSv/a	0.003 mSv/a	Achieved	
	Worker dose (Limit 50mSv/a)	NECSA Maximum individual dose - NNR ALARA limit on Maximum individual dose 20mSv/a	11.75 mSv/a	Achieved	
		Average individual Dose NNR ALARA Target <5mSv/a	0.66 mSv/a	Achieved	Worker doses were within the ALARA targets set.

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
		Vaalputs Maximum individual dose - NNR ALARA limit on Maximum individual dose <20 mSv/a	0.89 mSv/a	Achieved	Worker doses were within the ALARA targets set.
		Average individual Dose NNR ALARA Target <5mSv/a	0.13 mSv/a	Achieved	
		RENS Maximum individual dose	125 mSv/a	Not Achieved	Maximum individual dose of 50 mSv/a was exceeded for 8 mines and a total of approximately 424 workers. This represents a significant improvement over the situation in the previous period where 1211 workers received doses above the limit..
		Average individual Dose NNR ALARA target <5mSv/a	6.29 mSv/a	Not Achieved	The average individual dose varies upwards slightly due to the use of a different method of calculation from dose measurements provided from the mines. This value also takes into account all exposure pathways and was based on a different reporting format than was used for the previous year.
		KNPS Maximum individual dose	17 mSv/a	Achieved	
		Average individual dose NNR ALARA Target <5mSv/a	1.0 mSv/a	Achieved	

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
	Public risk	Av = 10^{-8}/a Max= 5 x 10^{-6}/a	KNPS - 2 x 10^{-9} 3 x 10^{-6}	Achieved	This performance factor was only applicable to Koeberg Programme
	Worker risk	Av = 10^{-5}/a Max=5 x 10^{-5} /a	KNPS - Av=2 x 10^{-6} Max=3 x 10^{-5}	Achieved	This performance factor was only applicable to Koeberg Programme
	Response time to authorisation submissions	Average of < 90 days PBMR SAR – 1 year	RENS Conversion to CoR = 274 days ACR's = 97 days Clearance of land = 171 days New applications = 103 days	Not Achieved	Delays are mainly due to limited human resource capacity in the RENS programme. A total of 60 applications were handled during 2003/4. Of the 60 applications, 19 were new applications, 3 were conversion requests received in 2003 and 23 were conversions that were received in 2001 and 2002.
			NTWP 175 days	Not Achieved	Represents average response time for all submissions including LCR's, routine reports and occurrences. Due to the nature of some reported occurrences closeouts could not be effected within the 90-day target. The average response time for LCR's was 71 days.
			KNPS 16 days	Achieved	
			PBMR 89 days	Achieved	
	Quality of NNR responses to authorisation submissions	NTWP: 75%	75%	Achieved	The measure was determined in consultation with NECSA and is based on NECSA feedback.

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
		PRD 80%	100%	Achieved	No Eskom rejection of PRD correspondence
2. To regulate the reduction and management of public and workers doses for all facilities within the ALARA principle (As- Low-As-Reasonably-Achievable principle)	A developed and implemented plan for actions to be authorised/ investigated	All actions identified	A number of sectors have been identified so far (Zircon, Fertilizer, Cement, National Ports Authority, Aircraft components companies, Refurbishment companies, etc.)	Not Achieved	Internal processes are under way to complete the identification.
	Dose quantified for all facilities through safety assessment	All doses quantified as part of safety assessment	Doses quantified for all authorised facilities	Achieved	
	Risk quantified for all facilities through risk assessments	Risk quantification included in safety assessments	Risk calculations included in safety assessments for Koeberg and Necsa	Achieved	
	Risk-optimisation strategies	Approved NNR policy document on application of risk criteria.	Policy at draft stage	Not Achieved	On going use of Koeberg PRA for risk optimisation measures

3. To ensure a holistic compliance assurance approach including safety culture enhancement	Compliance index	80%	Koeberg: 90%	Achieved	
			NTWP: 99%	Achieved	
			RENS 55%	Not Achieved	110 inspections were conducted. Limited human resource capacity in the RENS programme resulted in only 55% of the target being achieved. Vacancies in the RENS programme are being filled.
4. Review and implement the current legislation (NNRA) and update the associated regulatory rules	A plan for Conditions of authorisations including alignment to published standards	Revised Conditions of authorisations	60% On going	Not Achieved	Awaiting formal comment by DME on the Board recommendation regarding safety standards
OBJECTIVES	**KEY PERFORMANCE INDICATOR**	**TARGET**	**ACTUAL**	**PERFORMANCE RESULTS**	**NOTES**
5. To conduct regulatory research and development	Objectives from Strategic Plan	Research report on the background radioactivity levels in South Africa	Research report	Achieved	
		Research report on the development of a national radon survey strategy for South Africa	Research report	Achieved	

B. STAKEHOLDER SATISFACTION

OBJECTIVES	KEY PERFORMANCE INDICATORS	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
6. To ensure effectiveness of all bilateral agreements and other international collaborations	A plan on bilateral agreements and international collaboration	Documented status of bilateral agreements and implementation of existing ones.	Status Report on bilateral agreements produced, and various international collaborations undertaken.	Achieved	
7. To improve stakeholder relation management	Established Public Information Forums at Necsa, Koeberg and Vaalputs.	Forums established for communities living around licensed facilities	Forum established in respect of Pelindaba; Vaalputs; and Atlantis communities	Achieved	
	Satisfaction index	75%	69%	Not achieved	An index of 69% represent an improvement by the NNR from its last measured index of 53%, although it is still lower than the target index of 75% which was probably an unrealistic target. The NNR has revised its communication strategy and plan to also address the issues raised in the stakeholder satisfaction survey.
	Established mechanisms to comply with Access to Public Information Act	Manuals in four languages	English, Zulu, Tsonga and Sepedi	Achieved	

C. INTERNAL BUSINESS PROCESSES

OBJECTIVES	KEY PERFORMANCE INDICATORS	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
8. To improve business management practices	Develop policy and plan for integrated planning, budgeting and control system	Integrated NNR strategic plans, budgeting and control system	Integrated NNR strategic plans document	Achieved	
	Develop a document on measurement methods, including scoreboard performance measures	Document on Measurement Methods	Procurement processes were initiated to seek assistance from external stakeholders	Not Achieved	This objective has been redefined to realign it with the Human Resources strategic objective and included in the next planning cycle.
9. To enter into institutional agreements	Cooperative governance agreements concluded	Conclude cooperative governance agreements by end of financial year	Ongoing, the draft agreements are at various stages of completion.	Not achieved	Three draft agreements are being finalized while two others are ready for public comment.
10. To facilitate the implementation of the NNR transformation policy and plan	NNR transformation policy and plan implemented	Report on implementation of transformation policy and plan	Reports submitted to Board and relevant Board Committees.	Achieved	Employment Equity; Procurement; Human resource practices alignment to NNR strategic objectives; Internal business processes; Delivery on core business; and stakeholder interaction, reported to Board.

D. HUMAN RESOURCES

OBJECTIVE	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
11. To realign management style, policies and procedures for HR with SA legislation and objectives	Stakeholder satisfaction (Employee satisfaction)	Satisfaction index improved from a baseline of 53 to 68	Employee survey not yet conducted	Not achieved	The satisfaction survey scheduled for the next financial period

12. To implement capacity building and development	Capacity building and development programmes improving NNR performance	Participation in the development and implementation of nuclear-related education, training and skills development programmes	Participated in programmes with North-West University, and Wits University. Cooperated with nuclear industry and DME to participate in nuclear-related training courses run by Framatome, in France	Achieved	
	Employment equity	80:20 B/W in Top Management 67:33 B/W in Senior Management 45:55 B/W in Professional band 36:64 B/W Technical/Qualified Administrative	80:20 B/W Top Management 62.5:37.5 B/W Senior Management 50:50 B/W Professional band 41:59 B/W Tech/Qualified Admin	Achieved	The ratio at Senior Management level was affected by the resignation of a manager in January 2004. The new appointment is a Black person.

Balance sheet at 31 March 2004

	Notes	2004 R	2003 R
Assets			
Non-current assets			
Property and equipment	2	**1,952,916**	2,252,831
Retirement benefit asset	5	**-**	624,000
Current assets		**24,709,513**	16,521,566
Trade and other receivables	3	**9,502,143**	7,049,531
Cash and cash equivalents	12.2	**15,207,370**	9,472,035
		26,662,429	19,398,397
Equity and liabilities			
Reserves			
Accumulated deficit		**(1,485,725)**	(4,840,447)
Non-current liabilities			
Retirement medical benefits	5	**22,774,000**	20,947,000
Current liabilities		**5,374,154**	3,291,844
Trade and other payables		**2,789,469**	1,180,030
Provisions	6	**2,584,685**	2,111,814
		26,662,429	19,398,397

Income statement for the year ended 31 March 2004

	Notes	2004 R	2003 R
Operating income	7.1	**48,704,731**	44,553,545
Operating expenses		**(46,136,738)**	(44,281,401)
Operating surplus		**2,567,993**	272,144
Interest received		**786,729**	764,105
Net surplus for the year		**3,354,722**	1,036,249

Statement of changes in equity for the year ended 31 March 2004

	Accumulated deficit
	R
Balance at 31 March 2002	(5,876,696)
Surplus for the period	1,036,249
Balance at 31 March 2003	**(4,840,447)**
Surplus for the period	**3,354,722**
Balance at 31 March 2004	**(1,485,725)**

Cash flow statement for the year ended 31 March 2004

	Notes	2004 R	2003 R
Cash flow from operating activities		**6,540,858**	**2,830,788**
Cash receipts from authorisation holders and applicants		46,252,119	42,352,328
Cash paid to suppliers and employees		(40,497,990)	(40,285,645)
Cash generated from operations	12.1	**5,754,129**	**2,066,683**
Interest received		786,729	764,105
Cash flow from investing activities			
Acquisition of equipment		(805,523)	(913,372)
Net increase in cash and cash equivalents		**5,735,335**	**1,917,416**
Cash and cash equivalents at beginning of the period		9,472,035	7,554,619
Cash and cash equivalents at end of the period	12.2	**15,207,370**	**9,472,035**

Notes to the financial statements for the year ended 31 March 2004

1 Accounting policy

The annual financial statements have been prepared in accordance with South African Statements of Generally Accepted Accounting Practice. The following are the principle accounting policies of the National Nuclear Regulator which are, in all material respects, consistent with those applied in the previous year, except that it departed from AC105; Leases in order to achieve fair presentation.

1.1 Basis of preparation

The financial statements have been prepared on the historical cost basis.

1.2 Revenue recognition

Revenue is recognised when it is probable that future economic benefits will flow to the enterprise and these benefits can be measured reliably.
Revenue comprises of authorisation fees and other special projects.
Revenue arising from authorisation fees is recognised on an accrual basis in accordance with the substance of the relevant agreements.

1.3 Irregular, fruitless and wasteful expenditure

Irregular expenditure means expenditure incurred in contravention of, or not in accordance with, a requirement of any applicable legislation, including the PFMA.
Fruitless and wasteful expenditure means expenditure that was made in vain and would have been avoided had reasonable care been exercised.
All irregular, and fruitless and wasteful expenditure is charged against income in the period in which it is incurred.

1.4 Retirement benefit cost

The NNR operates both a defined benefit plan in respect of post-retirement medical aid contributions as well as in respect of the pension fund. For the defined benefit plans, the defined benefit obligation and the related current service cost is determined by using the projected unit credit method. The defined benefit plans are subject to an annual actuarial valuation.
A portion of the actuarial gains and losses is recognised as income or expense, if the net cumulative unrecognised actuarial gains and losses at the end of previous reporting period exceed the greater of:
- 10% of the present value of the defined benefit obligation at that date, or
- 10% of the fair value of any plan assets at that date.

The portion of actuarial gains and losses that is to be recognised, is equal to the excess calculated using the above limits, divided by the expected average remaining working lives of the employees participating in the plan.
Payments to the defined contribution benefit plan is charged to the income statement in the year to which they relate.

1.5 Foreign currencies

Transactions in foreign currencies are accounted for at the rates of exchange ruling on the date of the transactions. Gains and losses arising from the settlement of such transactions are recognised in the income statement.

1.6 Property and equipment

Property and equipment except for land are stated at historical cost less depreciation. Depreciation is calculated on the straight-line method to write off the cost of each asset over its estimated useful life:

Property - land	Not depreciated
Property - buildings	20 years
Office furniture	10 years
Office equipment	5 years
Computer equipment	3 years
Scientific and technical equipment	5 years
Computer software	3 years

Notes to the financial statements for the year ended 31 March 2004

Accounting policy (continued)

1.7 Leasing

Leases under which the risks and benefits of ownership are effectively retained by the lessor are classified as operating leases. Obligations incurred under operating leases are charged to the income statement in equal instalments over the period of the lease.

1.8 Financial instruments

Recognition

Financial assets and financial liabilities are recognised on the NNR's balance sheet when the NNR becomes a party to the contractual provisions of the instument.

Financial Assets

The NNR's principle financial assets are accounts receivable and cash and cash equivalents.

Trade Receivables

Trade receivables are stated at their nominal value as reduced by appropriate allowances for estimated irrecoverable amounts.

Trade payables

Trade and other payables are stated at their nominal value.

Cash and cash equivalents

Cash and cash equivalents are measured at fair value.

1.9 Provisions

Provisions are recognised when the NNR has a present obligation as a result of past events, and it is probable that this will result in an outflow of economic benefits that can be estimated reliably.

1.10 Interest received

Interest is recognised on a time proportionate basis with reference to the principal amount receivable and the effective interest rate applicable.

1.11 Comparative figures

Where necessary, comparative figures have been adjusted to conform to changes in the presentation in the current

1.12 Impairment

At each balance sheet date, NNR reviews the carrying amounts of its tangible assets to determine whether there is any indication that those assets 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).

1.13 Government grant received

Government grants are recognised as income on a systematical basis over the period necessary to match the grants with the related costs which they are intended to compensate.

Notes to the financial statements for the year ended 31 March 2004

2 Property and equipment

	2004			2003		
	R	R	R	R	R	R
	Cost	Accumulated Depreciation	Book value	Cost	Accumulated Depreciation	Book value
2.1 Carrying amount as at the beginning of year	**8,989,885**	**(6,737,054)**	**2,252,831**	**8,911,807**	**(6,435,675)**	**2,476,132**
Furniture	627,307	(337,260)	290,047	548,508	(288,226)	260,282
Office equipment	673,096	(412,471)	260,625	594,432	(336,376)	258,056
Computer equipment	4,042,413	(3,269,278)	773,135	4,381,217	(3,466,464)	914,753
Scientific and technical equipment	2,258,620	(2,162,092)	96,528	2,241,208	(2,093,712)	147,496
Computer software	960,949	(502,523)	458,426	718,942	(208,145)	510,797
Property - Buildings	213,750	(53,430)	160,320	213,750	(42,752)	170,998
Property - Land	213,750	-	213,750	213,750	-	213,750
2.2 Additions	**805,523**	**-**	**805,523**	**913,372**	**-**	**913,372**
Furniture	60,169	-	60,169	78,797	-	78,797
Office equipment	142,842	-	142,842	96,076	-	96,076
Computer equipment	297,574	-	297,574	496,492	-	496,492
Scientific and technical equipment	98,145	-	98,145	-	-	-
Computer software	206,793	-	206,793	242,007	-	242,007
Property - Buildings	-	-	-	-	-	-
Property - Land	-	-	-	-	-	-
2.3 Disposals / adjustments	**(84,347)**	**52,646**	**(31,701)**	**(835,294)**	**831,974**	**(3,320)**
Furniture	-	-	-	2	(2)	-
Office equipment	-	-	-	(17,412)	17,412	-
Computer equipment	(84,347)	52,646	(31,701)	(835,296)	831,976	(3,320)
Scientific and technical equipment	-	-	-	17,412	(17,412)	-
Computer software	-	-	-	-	-	-
Property - Buildings	-	-	-	-	-	-
Property - Land	-	-	-	-	-	-
2.4 Depreciation	**-**	**(1,073,737)**	**(1,073,737)**	**-**	**(1,133,353)**	**(1,133,353)**
Furniture	-	(56,912)	(56,912)	-	(49,032)	(49,032)
Office equipment	-	(98,667)	(98,667)	-	(93,507)	(93,507)
Computer equipment	-	(531,912)	(531,912)	-	(634,790)	(634,790)
Scientific and technical equipment	-	(44,035)	(44,035)	-	(50,968)	(50,968)
Computer software	-	(331,846)	(331,846)	-	(294,378)	(294,378)
Property - Buildings	-	(10,365)	(10,365)	-	(10,678)	(10,678)
Property - Land	-	-	-	-	-	-
2.5 Carrying amount as at the end of year	**9,711,061**	**(7,758,145)**	**1,952,916**	**8,989,885**	**(6,737,054)**	**2,252,831**
Furniture	687,476	(394,172)	293,304	627,307	(337,260)	290,047
Office equipment	815,938	(511,138)	304,800	673,096	(412,471)	260,625
Computer equipment	4,255,640	(3,748,544)	507,096	4,042,413	(3,269,278)	773,135
Scientific and technical equipment	2,356,765	(2,206,127)	150,638	2,258,620	(2,162,092)	96,528
Computer software	1,167,742	(834,369)	333,373	960,949	(502,523)	458,426
Property - Buildings	213,750	(63,795)	149,955	213,750	(53,430)	160,320
Property - Land	213,750	-	213,750	213,750	-	213,750

The property (land and building) consists of an office block situated on erf 3187 Melkbosch Strand in the Blaauberg Municipality, Cape Division, Western Cape Province.

Notes to the financial statements for the year ended 31 March 2004

	2004 R	2003 R
3 Trade and other receivables		
Trade receivables	**8,381,504**	7,386,853
Less: Provision for doubtful debts	**(902,419)**	(549,351)
Net trade receivables	**7,479,085**	6,837,502
Other receivables	**2,023,058**	212,029
	9,502,143	7,049,531

4 Bank balances and cash

Bank balances and cash comprise cash. The carrying amount approximates to its fair value.

5 Retirement benefits

Post-retirement medical benefits

The NNR has made provision for a medical aid scheme covering employees who were in its employ on or before 1 July 1990 and who retire from its service. The NNR has also made provision to cover a portion of the subscription to the medical scheme in respect of those members of staff who joined the NNR between 1 July 1990 and 31 December 1995 and who retire from its service.

Post-retirement pension benefit

The NNR has made provision for a pension scheme covering all its permanent employees. The funds are governed by the Pension Funds Act, 1956 as amended.

The defined benefit schemes are valued actuarially at an interval of not more than 3 years using the projected unit credit method. The schemes were last actuarially valued during March 2004. In arriving at his conclusion, the actuary took into account the following assumptions at balance sheet date (expressed as weighted averages):

	Defined benefit pension plan		Post-employment medical benefit	
	2004	2003	**2004**	2003
Discount rate at 31 March 2004	**9.00%**	10.00%	**9.00%**	9.00%
Expected return on plan assets at 31 March 2004	**9.20%**	12.00%	-	-
Annual increase in health care costs	**8.00%**	8.00%	**8.20%**	8.20%

Notes to the financial statements for the year ended 31 March 2004

5 Retirement benefits (continued)

The amount included in the balance sheet arising from the NNR obligation in respect of the defined retirement benefit plans are as follows:

	Defined benefit pension plan		Post-employment medical benefit	
	2004	2003	**2004**	2003
	R	R	**R**	R
Amounts recognised in the balance sheet				
Present value of funded obligations	**29,626,000**	27,307,000	**22,774,000**	20,947,000
Fair value of plan assets	**(33,768,000)**	(24,060,000)	**-**	-
	(4,142,000)	3,247,000	**22,774,000**	20,947,000
Unrecognised actuarial loss	**(3,871,000)**	(3,871,000)	**-**	-
Unrecognised post employment benefit asset	**8,013,000**	-	**-**	-
Net liability in balance sheet	**-**	(624,000)	**22,774,000**	20,947,000
Movements in the net liability recognised in the balance sheet are as follows				
Net liability at beginning of the year	**(624,000)**	-	**20,947,000**	17,667,343
Change in accounting estimate	**-**	-	**-**	916,657
Net liability at beginning of the year	**(624,000)**	-	**20,947,000**	18,584,000
Net expense recognised in the income statement	**4,838,000**	2,392,000	**2,535,821**	2,939,548
Contributions	**(4,214,000)**	(3,016,000)	**(708,821)**	(576,548)
Net liability/(asset) at end of the year	**-**	(624,000)	**22,774,000**	20,947,000

Going concern

The NNR is required to make provision for a liability it has in respect of post-retirement medical benefits for certain categories of staff. In order to comply with the provisions of AC 116, the provision has to be made in a prescribed way.
The liability resulted from a decision by the Board of the erstwhile Council for Nuclear Safety to provide medical aid benefits to staff who were in the employ of the NNR on or before 31 December 1995, and who retired from the services of the NNR.
The NNR applied to the Minister of Finance to establish a fund for purposes of pre-funding this liability. However, this request was denied and the NNR was instructed to pay for this liability on a "pay as you go" basis by providing for the expenditure on an annual basis.

Notes to the financial statements for the year ended 31 March 2004

6 Provisions

	Leave pay provision R	Bonus provision R	Total R
Opening balance	1,643,845	467,969	2,111,814
Additional provision	768,634	1,136,772	1,905,406
Utilisation of provisions	(330,679)	(1,101,855)	(1,432,534)
Closing balance	2,081,800	502,886	2,584,686

	Notes	2004 R	2003 R
7 Operating surplus			
Operating surplus is stated after taking into account the following:			
7.1 Operating income			
7.1.1 Revenue		**41,084,828**	36,963,224
Authorisation fees		**41,081,721**	36,814,742
Other		**3,107**	148,482
State contributions	**10**	**7,610,000**	7,282,000
7.1.2 Foreign exchange gain		**9,903**	308,321
Total operating income		**48,704,731**	44,553,545

Notes to the financial statements for the year ended 31 March 2004

	Notes	2004 R	2003 R
7 Operating surplus (continued)			
7.2 Expenditure			
7.2.1 Auditor's remuneration		**393,959**	157,885
Audit fees			
- current year		**113,838**	52,805
- prior year		**276,831**	104,362
Expenses			
- current year		**1,296**	-
- prior year		**1,994**	718
7.2.2 Depreciation		**1,073,737**	1,133,353
Office furniture		**56,912**	49,032
Office equipment		**98,667**	93,507
Computer equipment		**531,912**	634,790
Scientific and technical equipment		**44,035**	50,968
Computer software		**331,846**	294,378
Property - buildings		**10,365**	10,678
7.2.3 Fees for services		**1,501,229**	2,063,694
Technical services		**602,727**	1,150,651
Administration services		**503,159**	864,124
Internal audit and services		**395,343**	48,919
7.2.4 Directors' emoluments	9	**478,500**	201,403
Service fee		**478,500**	174,397
Expenses		**-**	27,006
7.2.5 Staff costs		**33,327,292**	31,115,453
Salaries, allowances and annual payments		**30,849,584**	27,443,810
Included in staff costs are:			
Defined benefit plan expenses		**7,393,000**	5,333,000
- current service cost		**3,994,000**	2,894,000
- interest cost		**4,343,000**	3,953,000
- return on assets		**(2,214,000)**	(1,888,000)
- actuarial gain recognised		**(6,743,000)**	374,000
- Unrecognised post employment benefit asset		**8,013,000**	-
Post-retirement medical benefit		**2,535,821**	3,856,204
Post-retirement medical benefit		**2,535,821**	2,939,548
Change in accounting estimate		**-**	916,656
(Being change in past services cost, non-vested benefits)			
7.2.6 Loss on scrapping of assets		**31,701**	3,320
7.2.7 Bursaries		**132,768**	417,768
7.2.8 Operating leases		**1,549,848**	1,453,206
Office building		**1,110,136**	1,084,201
Equipment		**366,013**	294,142
Vehicles		**73,699**	74,863

During 2003 the entity entered into a 3 year operating lease in respect of photo copy machines with a cost price of R 1,295,856. AC105 requires this lease to be classified as a finance lease. However, the lease has been accounted for as an operating lease in order to ensure consistency with prior year accounting treatment of the lease, as well as with the guidance issued by National Treasury in this regard. The average lease payments are R 35,744 per month with no contingent lease payments. The lease agreement is not renewable at the end of the lease term and does not have the option to acquire the equipment. The lease agreement does not impose any restrictions.

Notes to the financial statements for the year ended 31 March 2004

	2004 R	2003 R

8 Special Project

In terms of section 5(b)(i) of the NNR Act, (Act No 47 of 1999) the Regulator should exercise regulatory control related to safety over the siting, design, construction, operation, manufacture of component parts, and decontamination, decommissioning and closure of nuclear installations. In compliance with the aforegoing during the financial year the NNR had an arrangement with Eskom, the applicant for the Pebble Bed Modular Reactor nuclear installation licence for certain fees, disbursements and expenses necessarily incurred and not provided for in the licence application fee as contemplated in section 28 of the National Nuclear Regulator Act project. The full income and expenditure associated with the project has been:

Income from Eskom	**6,771,183**	9,938,966
Expenditure (Foreign consultants)	**6,771,183**	9,938,966

9 Directors' and executive staff emoluments

For the year ended 31 March 2004	Months in service	Salaries/ fees R	Bonuses R	Pension contributions R	Other contributions R	Total R
Non-Executive Directors						
Mr G Aboobaker	12	-	-	-	-	-
Prof K Bharuth-Ram	12	100,216	-	-	-	100,216
Dr SWP de Waal	12	-	-	-	-	-
Mr D Elbrecht	12	30,438	-	-	-	30,438
Mr T Khumalo	7	-	-	-	-	-
Dr T Lesoli	7	34,665	-	-	-	34,665
Mr R C Lockwood	8	32,989	-	-	-	32,989
Ms TNM Mashanda	7	53,267	-	-	-	53,267
Dr JM Matjila	7	-	-	-	-	-
Ms TN Mgoduso	7	27,062	-	-	-	27,062
Adv BM Mkhize	7	49,039	-	-	-	49,039
Ms EK Mohamed	5	12,860	-	-	-	12,860
Mr AHCH Motaung	12	28,200	-	-	-	28,200
Dr J M Stewart	12	75,787	-	-	-	75,787
Prof SH Taole	5	22,140	-	-	-	22,140
Ms TN Zungu	12	-	-	-	-	-
		466,663	**-**	**-**	**-**	**466,663**
Independent audit committee member						
Mr BM Hawksworth		11,837	-	-	-	11,837
		11,837	-	-	-	11,837
Executive Director						
Ms LB Zondo (CEO)		691,068	-	-	-	691,068
		691,068	**-**	**-**	**-**	**691,068**
Executive staff						
Ms SR Bogatsu		395,325	34,280	60,891	14,501	504,997
Mr GA Clapisson		440,383	43,937	68,314	28,147	580,781
Dr ND Kgwadi		440,383	38,459	68,314	19,627	566,783
Mr SS Motlhaloga		261,068	-	-	-	261,068
Mr CO Phillips		71,582	-	10,703	6,131	88,416
Dr AS Tsela		440,383	43,937	68,314	26,842	579,476
Mr PD Weideman		107,701	-	14,797	4,074	126,572
		2,156,825	**160,613**	**291,333**	**99,322**	**2,708,093**

Note: These emoluments are for all directors, including existing as well as past directors. Certain members participated in various other Board committees

Notes to the financial statements for the year ended 31 March 2004

		2004 R	2003 R
10 Future operating lease commitments			
10.1	Equipment	**595,920**	204,671
	Vehicles	**77,040**	78,697
	Property	**1,221,144**	1,745,796
	Up to 1 year	**1,894,104**	2,029,164
10.2	Equipment	**1,819,068**	311,109
	Vehicles	**35,262**	112,302
	* Property	**-**	-
	1 to 5 years	**1,854,330**	423,411

* The NNR has signed a one year lease on the building with an option to renew annually.

11 Related party transactions

		2004		2003	
Institution	Transaction type	Amount of transaction R	Amount received R	Amount of transaction R	Amount received R
Department of Minerals and Energy	State contributions	**7,610,000**	**7,610,000**	7,282,000	7,282,000

12 Notes to the cash flow statement

	2004 R	2003 R
12.1 Cash generated by operations		
Operating surplus	**2,552,760**	272,144
Adjustment for :	**4,397,610**	3,817,626
Depreciation	**1,073,737**	1,133,353
Net loss on disposal of obsolete assets	**31,701**	3,320
Foreign exchange gain / loss	**15,233**	-
Increase / (decrease) in provision for leave pay and bonuses	**472,871**	(184,562)
Decrease in provision for pension retirement benefit	**624,000**	(624,000)
Increase in provision for retirement medical benefit	**1,827,000**	3,279,657
Increase in provision for doubtful debts	**353,068**	209,858
Working capital changes	**(1,196,241)**	(2,023,087)
Increase in accounts receivable	**(2,805,680)**	(2,201,217)
Increase in accounts payable	**1,609,439**	178,130
	5,754,129	2,066,683

12.2 Cash and cash equivalents

Cash and cash equivalents consist of cash on hand. The carrying amount of these assets approximate their fair value. Cash and cash equivalents at year-end are represented by the following balance:

Cash at Bank	**15,207,370**	9,472,035

Notes to the financial statements for the year ended 31 March 2004

13 Financial instruments

Financial instruments consist of cash and cash equivalents, trade and other receivables, and trade and other payables.

13.1 Credit risk

Financial assets, which potentially subject the NNR to concentrations of credit risk, consist principally of cash and trade receivables. Trade receivables are presented net of the allowance for doubtful debts. Credit risk with respect to trade receivables is limited owing to the large number of customers being dispersed across different industries. Accordingly the NNR has no significant concentration of credit risk.
The carrying amounts of financial assets included in the balance sheet represent the exposure of the NNR to credit risk in relation to those assets.
Trade and other receivables are controlled by policies and procedures. The NNR does not have any significant exposure to any individual customer or counterparty.

13.2 Interest rate risk

The company's exposure to interest rate risk and the effective interest rates on the financial instruments at the balance sheet date are:

31 March 2004

	Weighted average effective interest rate %
Assets	
Cash	6.39%

13.3 Foreign currency risk

The NNR undertakes certain transactions denominated in foreign currencies; hence exposure to exchange rate fluctuations arises. It is not the policy of the NNR to take out cover on these outstanding foreign currency transactions because these transactions take place on an ad-hoc basis.

13.4 Fair value of financial instruments

At 31 March 2004 the carrying amounts of cash, accounts receivable and accounts payable approximated their fair values due to the short-term maturities of these assets and liabilities. The net fair value of the assets and liabilties of the NNR are stated below:

	2004 R	2003 R
Assets		
Cash and cash equivalents	**15,207,370**	9,472,035
Trade and other receivables	**9,502,143**	7,049,531
Liabilities		
Trade and other payables	**2,789,469**	1,180,030

Notes to the financial statements for the year ended 31 March 2004

14 Value-added statement	Notes	2004 R	2003 R
- Revenue		48,704,731	44,553,545
- Paid to suppliers for materials and services		(14,213,417)	(11,831,192)
- Interest earned		786,729	764,105
Total wealth created		35,278,043	33,486,458
- Salaries, wages and other benefits		30,849,584	31,316,856
- Providers of capital		-	-
- Net financing costs		-	-
- Dividends		-	-
- Central and local government		-	-
- Reinvested in the organisation to maintain and develop operations		4,428,459	2,169,602
- Depreciation and recoupments		1,073,737	1,133,353
- Retained income		3,354,722	1,036,249
Total wealth distribution		35,278,043	33,486,458
Value-added ratios			
- Number of employees		75	76
- Revenue per employee		649,396	586,231
- Wealth created per employee		470,374	440,611

ABBREVIATIONS

ALARA – As Low As Reasonably Achievable
CoM – Chamber of Mines
CSS – Corporate Support Services
DEAT – Department of Environmental Affairs and Tourism
DME – Department of Minerals and Energy
DWAF – Department of Water Affairs and Forestry
EIA – Environmental Impact Assessment
EPLC – Emergency Planning Liaison Committee
EXCO – Executive Committee
FRAREG – Framatome Regulator's Group
HR – Human Resources
IAEA – International Atomic Energy Agency
IDCC – Interdepartmental Co-ordination Committee
IDMC – Interdepartmental Disaster Management Committee
IRPA – International Radiation Protection Agency
IT – Information Technology services
JRC – Joint Review Committee
KEDC – Koeberg Environment Development Committee
KLBM – Koeberg Licensing Bases Manual
KLLC – Koeberg Licensing Liaison Committee
KNPS – Koeberg Nuclear Power Station
KSR – Koeberg Safety Review
MANCO – Management Committee
NECSA – South African Nuclear Energy Corporation
NERS – Network of Nuclear Regulators with Small Nuclear Programmes
NGO's – Non-governmental organisations
NNR – National Nuclear Regulator
NNRA – National Nuclear Regulator Act
NTWP – Nuclear Technology and Waste Products
NUSSC – Nuclear Safety Standards Committee
PBMR – Pebble Bed Modular Reactor
PFMA – Public Finance Management Act
PRD – Power Reactor Division
PSETA – Public Sector Education and Training Authority
RASSC – Radiation Safety Standards Committee
RENS – Regulation of Natural Sources
RSD – Regulatory Strategy Division
SAR – Safety Analysis Report
TRANSSC – Transport Safety Standards Committee
UK NSD – United Kingdom Nuclear Safety Directorate
WASSC – Waste Safety Standards Committee
mSv – milliSievert
μSv – microSievert
Sv – Sievert

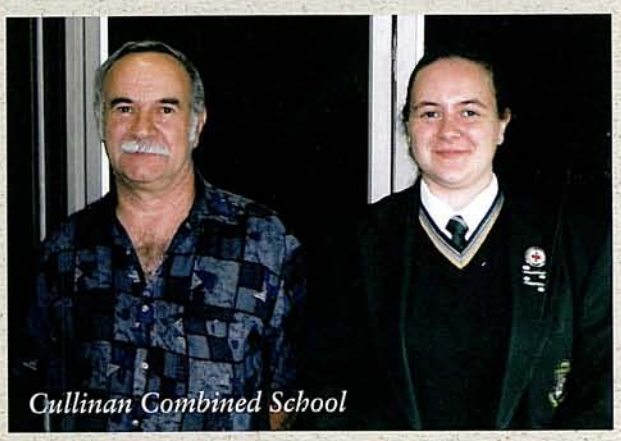
NNR Schools Project 2003



Silverton High School



Lenasia South Secondary



Cullinan Combined School

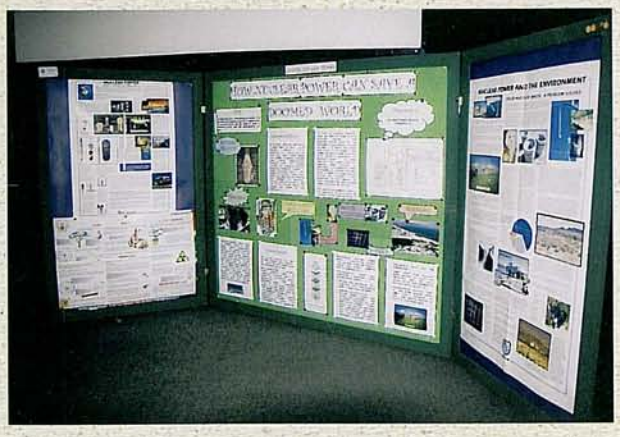


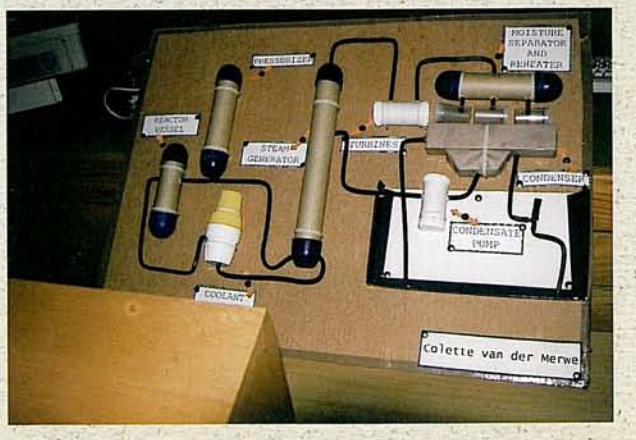
EPP Mhinga High School

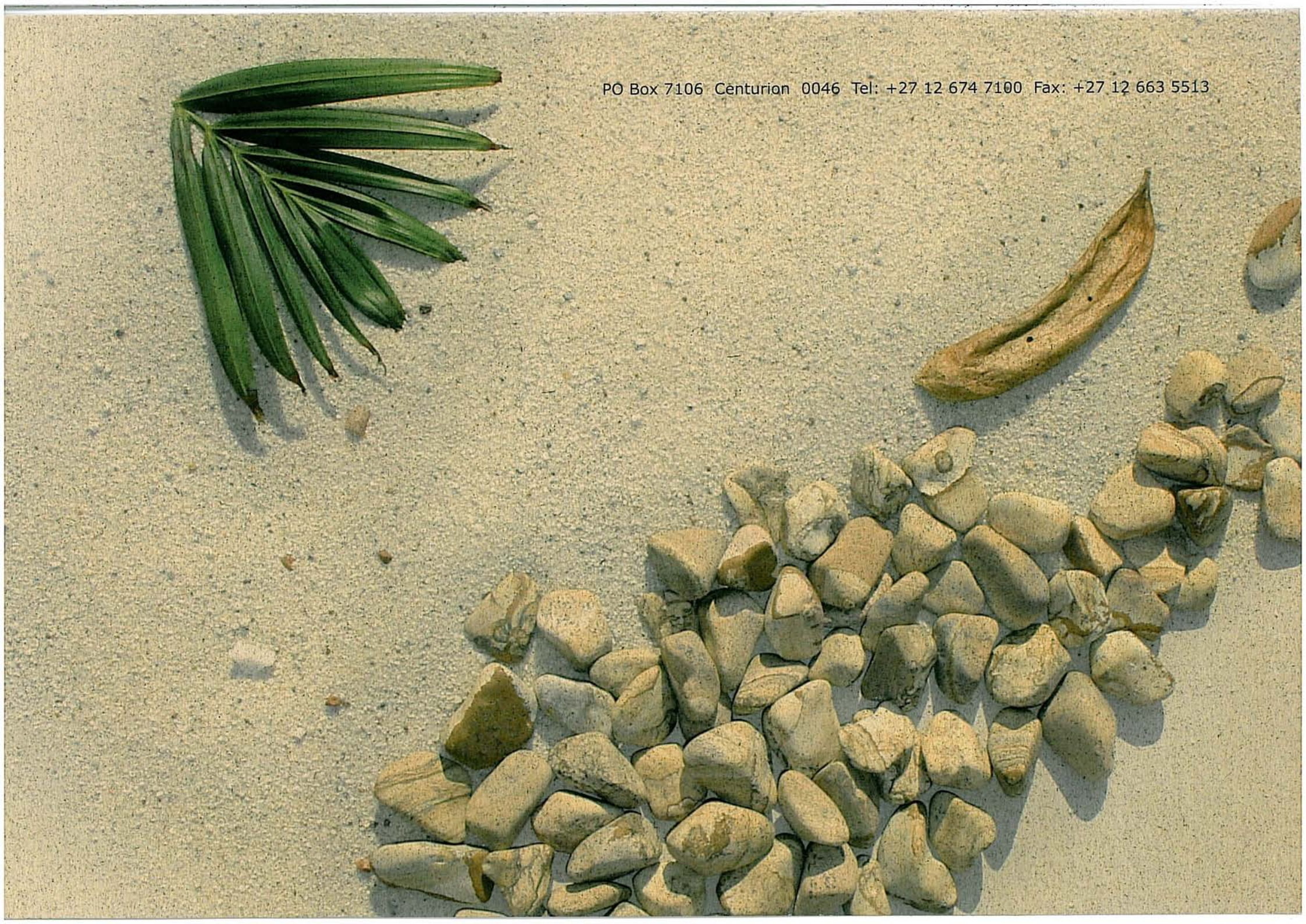


Pretoria Technical High School









PO Box 7106 Centurion 0046 Tel: +27 12 674 7100 Fax: +27 12 663 5513