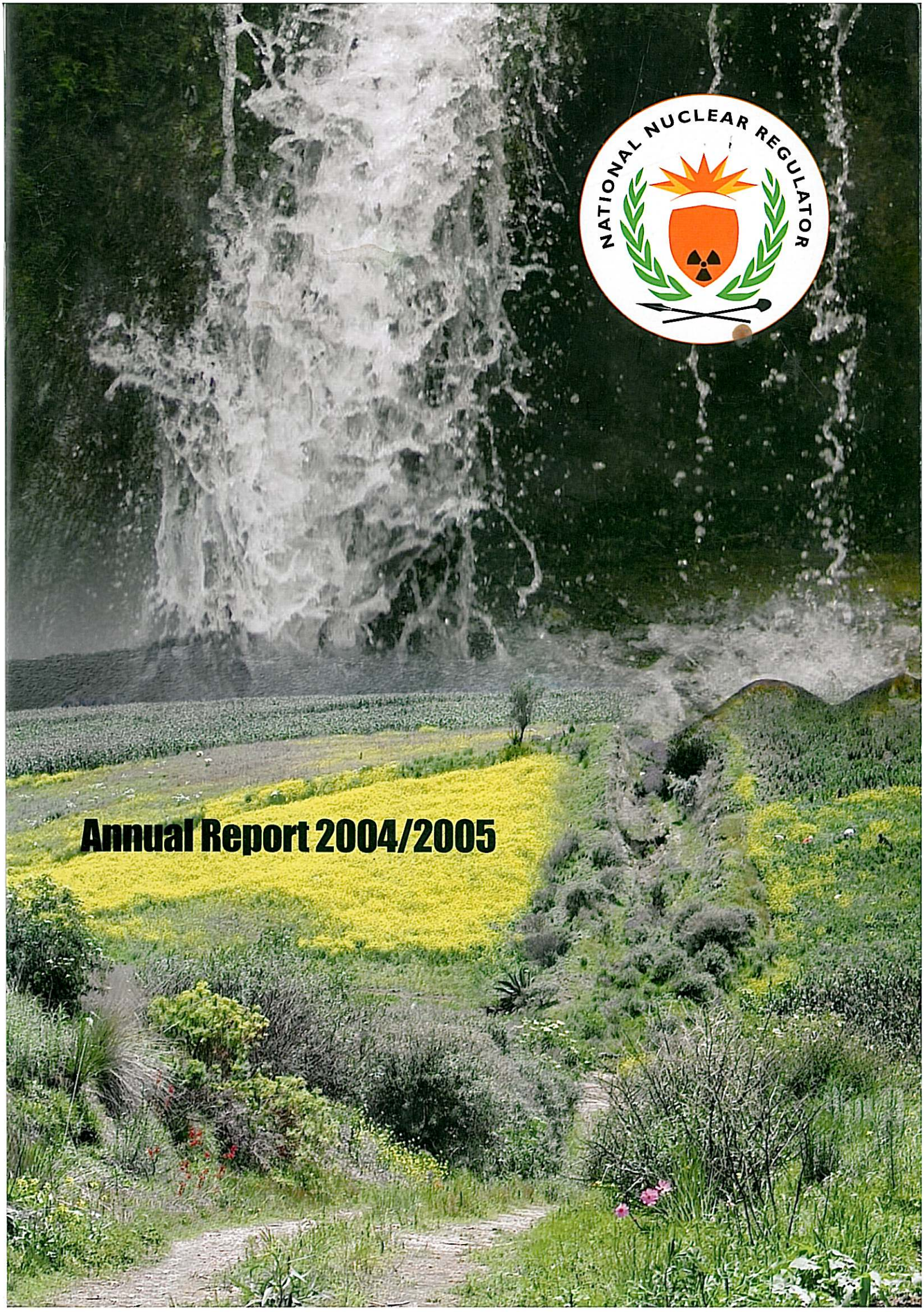

NATIONAL NUCLEAR REGULATOR
Annual Report 2004/2005

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.



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 office of the CEO also houses the Board Secretariat.

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 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

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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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 published in more than 120 scientific journals, has 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



DR S A TSELA

Dr Simanga Alex Tsela has 12 years' experience in the nuclear-related industry, as a researcher and lecturer, radiation protection scientist (technical assessor) and senior strategy executive of the NNR. He gained his BSc in Physics and Mathematics at the University of Swaziland, his MSc in Nuclear Physics at the University of Sussex (UK), his Ph.D in Applied Nuclear Physics at the University of the Witwatersrand (with some work done at Risoe National Laboratory, Denmark), and his MBA at Pretoria University. Dr Tsela has participated in numerous national and international conferences. He has ten written papers to his name, with radon monitoring and related subjects prominent among them. He is a member of the International Commission on Radiological Protection (ICRP), and serves as an IAEA consultant on the development of an international methodology for establishing derived concentration levels in soil.



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, has 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 BCom (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, and was promoted to her present post in 2003.



MS T MGODUSO

Ms Mgoduso 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 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 Executive 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).



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 BJuris 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 T LESOLI

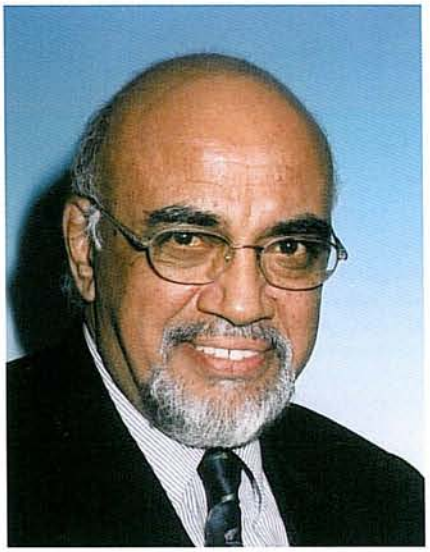
Dr Lesoli manages a health products distribution company, Mother Earth Distributors, marketing branded food supplements and doing health and nutrition education. Previous employment was largely in the hospital and healthcare fields, and in private medical practice in KwaZulu-Natal and Gauteng. Her school 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.



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 the year ended 31 March 2005 was generally characterised by sustained performance in the regulation of, and compliance by nuclear facilities with, occupational protection in the minerals and mining sector, and sustained movement towards attainment of the NNR's staff transformation goals.

In pursuing its regulatory functions, the NNR continued to enjoy excellent cooperation from the management and staff of organisations in the nuclear industry, namely Koeberg Nuclear Power Station, NECSA, the minerals and mining industries and the broad range of stakeholders in the scrap smelting and processing industries, the refurbishment of nuclear facilities, and the fertiliser manufacturing industry, as well as from small users of radioactive materials and service providers in the nuclear field. It is clear that these stakeholders value the presence and work of the NNR in assisting them to safeguard not only their own staff but also the general public and the environment of South Africa against radioactive hazards.

In a world in which environmental protection is gaining increased importance, it is inevitable that the NNR will remain in the media spotlight in relation to its regulatory functions at existing nuclear sites as well as in facilities such as Eskom's proposed Pebble Bed Modular Reactor. The NNR welcomes the interaction it has had with public organisations such as Earthlife Africa, which has helped the NNR remain focused on its responsibility of protecting the public from the harmful effects of nuclear radiation. In order to arrive at internationally accepted standards of safety and regulatory practice, the NNR has kept in close contact with its peer organisations throughout the world in scrutinising the safety-related aspects of all issues that fall under its jurisdiction. While Environmental Impact Assessment and Safety Case issues in respect of the PBMR are still awaiting resolution, we note that an "International PBMR Supplier Conference" is scheduled to take place in South Africa in August, with the claim "*The PBMR Company has received the highest support and endorsement from the South African Government...*".

The NNR has continued to make steady progress towards demographic representivity in its management, staffing and procurement. However, in order to ensure fully efficient delivery of regulatory services, the incoming CEO will need to achieve greater commitment from his management team and staff, and to put in place succession planning initiatives that are additional to the programmes that are already in place for staff capacity building, training and development.

The NNR continued throughout the year under review to enjoy good relations with peer nuclear regulators and with the International Atomic Energy Agency. The NNR also participated fully in international conferences and meetings under the auspices of the IAEA and other international nuclear bodies, and kept abreast of international best practice and developments relating to the French-built family of nuclear reactors in which Koeberg Nuclear Power Station falls.

The NNR's total operating revenue for the year was R52.57 million, of which R44.50 million came from services rendered to holders of nuclear licences (Koeberg Nuclear Power Station, the PBMR project, and NECSA) and holders of certificates of registration (mines and small users of radioactive materials and processes). R8.07 million came by way of direct Government grant.

The past year also saw changes at the Executive Management level, with Ms Louisa Zondo leaving when her term as Chief Executive Officer came to an end. Dr Alex Tsela very ably stepped in as Acting CEO while the selection and appointment of the new CEO took its course.

I wish to sincerely thank my Board of Directors for their critical and creative contribution to the Board's affairs, and to the outgoing CEO, Ms Zondo, and Dr Tsela for their willing support at all times.



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



CHIEF EXECUTIVE OFFICER'S FOREWORD



Dr Simanga Alex Tsela

The Chairperson of the NNR has commented in broad terms on the satisfactory trend in stakeholders' compliance with the provisions of their respective nuclear authorisations during the year under review. The focus of this report is to elaborate briefly on the facts concerned, full details of which are contained in the body of this annual report.

Last year there was a report on the emergency exercise which Koeberg Nuclear Power Station is required to hold periodically to ensure that any emergency situations would be appropriately addressed, and which the NNR is required to evaluate. The purpose of the exercise, held in February 2004, was to address the question of response within and outside of the Koeberg perimeter to an emergency situation.

Following the evaluation process, it is now reported that, overall, the exercise was considered a success. Implementation of the required corrective actions has been followed up in various forums, primarily the Emergency Planning Committee chaired by Eskom and attended by local authorities. Implementation was monitored for progress by the NNR, and is considered satisfactory.

Four meetings of the Koeberg Environs Development Committee, chaired by the NNR, were held in Cape Town over the reporting period. Present and future developments in the vicinity of Koeberg were discussed to ensure that the Koeberg emergency plan remains viable. Three meetings were also held with the various unions at Koeberg (namely MWU, EEA, NUM, NUMSA) during the reporting period. The main items of discussion were the emergency exercises, control zone access and medical examinations, outsourcing to contractors, the way forward in liaison between the NNR and the Atlantis community, and public communication generally.

The results of the NNR's monitoring of ongoing operations at Koeberg are that while a total of 345 problem notifications/occurrences were reported, none of them was significant in terms of occupational and public safety as defined in the NNR Act.

NNR monitoring of the environment in and around the NECSA Pelindaba site (west of Pretoria) revealed no radiation safety concerns to the community living around the site. There were also no safety concerns regarding radioactive waste management – the storage of radioactive waste – on the site itself.

A number of emergency drills and emergency exercises were conducted at Pelindaba over the reporting period. NECSA demonstrated that it has the ability to respond to a major incident. However, some deficiencies were identified, which were addressed in an action plan, the implementation of which is monitored by the NNR.

In respect of mining and mineral processing, the NNR's Regulation of Natural Sources (RENS) programme continued to focus much of its regulatory efforts on mines where workers may be exposed to radiation levels in excess of the dose limit. The successes achieved in reducing the number of workers thus exposed is illustrated by statistics for the past four years: 2001: 7931 workers; 2002: 1133 workers; 2003: 424 workers; 2004: 3 workers. One of the factors contributing to this improvement was the implementation of more rigorous compliance assurance measures by the NNR. Inspections conducted to verify the degree of compliance with the various programmes and procedures required of nuclear authorisation holders revealed improvement in the compliance index from 55% to 68% over the past year.

The NNR continued to review the nuclear installation licence application submitted by Eskom in July 2000 relating to the proposed Pebble Bed Modular Reactor. The main activities are linked to resolution of the key licensing issues and safety issues identified during the NNR review of the PBMR safety case. These activities are currently being progressed by 10 working groups composed of Eskom and PBMR staff with significant NNR involvement. The issuing of a nuclear installation licence for a reactor demonstration plant within the Koeberg perimeter will be subject to finalisation of the NNR's public hearing process in accordance with the NNR Act, and satisfactory assessment by the NNR of the associated Safety Case. The public will be notified and provided with information well in advance of the public hearings.

In conclusion, on behalf of myself and former CEO, Adv LB Zondo, I would like to express my sincere appreciation to the 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 to the organisation as a whole. I would also like to thank and pay tribute to the management and staff of the NNR for their efforts during the year in the execution of our mandate to protect the public, property and environment of South Africa against nuclear damage. All concerned are determined to continue to fulfill this obligation as required by legislation, to the best of their ability.



DR SIMANGA ALEX TSELA
ACTING CHIEF EXECUTIVE OFFICER

KOEBERG NUCLEAR POWER STATION

BACKGROUND

Eskom operates 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 exposure of personnel working at Koeberg is 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 2004 was 7.75 mSievert (mSv), compared to the regulatory limit of 50 mSv per annum. The total annual collective dose to the workforce for the year was 860.7 person-Sv. The total occupationally exposed workforce during 2004 numbered 1826, indicating an average annual individual dose of approximately 0.47 mSv. The figure 1 illustrates the dose distribution arising from the individual exposures accrued from 2001 to 2004.

There was only one outage during 2004, which served as a major contributor to the total collective dose of the work performed during 2004.

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

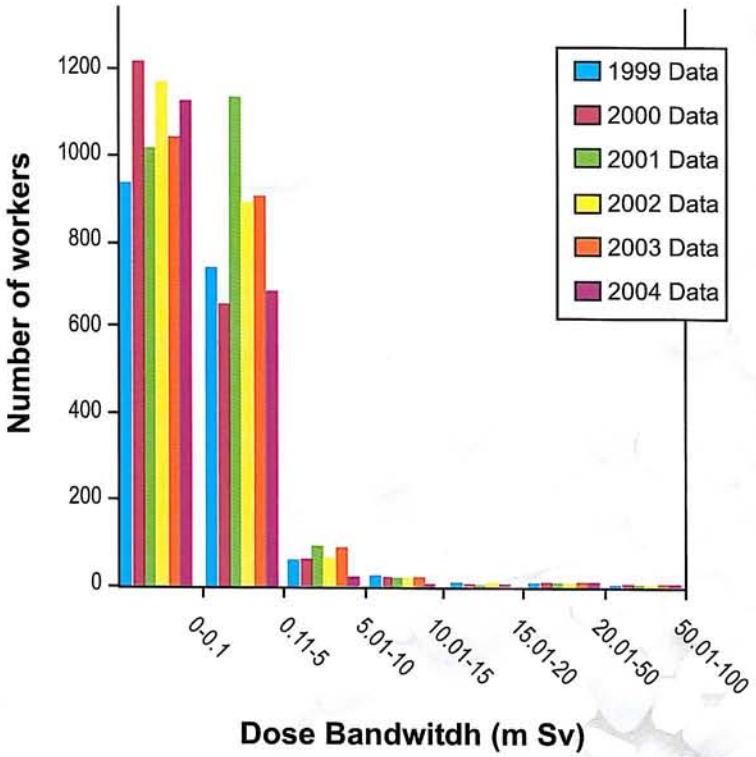


Figure 1: Occupational exposure for 2004

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.. Public exposure is controlled within strictly defined limits through the implementation of a radiological emissions and effluent management programme. This 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 independent and strict control is maintained on public exposure to radioactive releases.

Radioactivity in liquid and gaseous discharges from Koeberg during 2004 contributed a projected total individual dose of 8.72 µSv to the hypothetically most exposed group. The projected dose as a result of gaseous and liquid discharges was 1.06µSv and 7.66µSv respectively, which is well within the NNR limit of 250 µSv per annum, and meet the ALARA dose target of 10 µSv applicable for an annual period in which there is one refuelling outage.

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 drainage 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 radionuclides contributing the highest dose as a result of atmospheric and liquid discharges are shown in the following table.

Table 1: Percentage of AADQ discharged in effluent during 2004

Liquid Transport Pathway		Atmospheric Transport Pathway	
Radionuclide	% of AADQ	Radionuclide	% of AADQ
Ag-110m	60.30	I-134	13.89
Co-57	49.60	I-132	9.74
Co-58	24.57	I-135	4.95
Co-60	14.31	Co-60	3.71
Sb-124	7.49	Xe-135	3.71
Sb-133	6.52	Ag-110m	2.09

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 seawater. Sensitive gamma spectrometric measurements of biological materials, soil and air samples, vegetation and food, did not reveal any contamination, though very small quantities of 58-Co, 60-Co and 131-I, originating from Koeberg operations, were found in some marine samples. As a demonstration of 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 131-I(iodine), originating from therapeutic or diagnostic medical treatment of local residents, were detected on various occasions in Melkbosstrand sewage sludge. Trace quantities of Co-60 and Cs-137 were also detected in the effluent sample from the Melkbos sewage works. A widespread network of Environmental Thermo-Luminescent Dosemeters (TLDs) around Koeberg monitors 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 farther 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 the main aspects of the Koeberg Nuclear Power Station. as summarized below.

4.1 Plant Refuelling Outage Modifications

The NNR completed its review and approval of the following modifications implemented during Koeberg refuelling outages 114 and 214:

- Loose part monitoring replacement
- Loss of generator field protection
- Installation of surge protection on 24kV bus ducting
- Steam generator blow-down radiation trending
- Removal/bypassing of voltage regulators from certain inverters
- Replacement of pressure switches on KRT system
- Plant upgrade to SI units
- Reconfiguration of liquid effluent monitoring channels
- EAS 003 PO timer replacement
- Diesel generator increased pre-heat temperature

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 the French CP-1 family of nuclear power plants in response to the findings of the Koeberg periodic review completed in 1998.

The following CP-1 modifications were submitted to the NNR for review and implementation during outage 214:

- Improved leak-tightness discharge drains
- Retransmission of ASG 135VV opening/arming signals

- Modification to ASG valves
- Install oxygen analyser on TEG system

The plan is to implement the full set of modifications over a five-year period. This will depend on the availability of technical skills within both Eskom and the NNR.

4.3 Modifications linked to severe accidents

As reported in last year's annual report as part of their accident management strategy, 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. In February 2005 the NNR received an in-depth technical review report from an expert meeting held in Paris in December 2004 hosted by the French regulatory authority DGSNR. This will assist the NNR in arriving at a decision on this application. The NNR has also requested other opinions.

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 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. Eskom wishes to follow the French approach and has proposed to implement the modification to the containment sump strainers – technically very similar to modification proposed by Electricité de France (EdF) for its CP-1 plants. The NNR is currently assessing Eskom's proposal.

4.4 Koeberg Nuclear Fuel Management Strategy

NUCLEAR FUEL

The NNR assessed and approved Eskom proposal to increase the AFA-3G fuel assembly burn up limit to 55 GW.d/tU and the fuel rod burnup limit to 60 GW.d/tU.

SPENT FUEL STORAGE

The NNR reviewed and approved a series of modifications to the Spent Fuel Pool control and instrumentation systems – known as the ANSI Phase II modifications. These modifications were required to demonstrate compliance with the standard ANSI 57.2 adopted by Koeberg after the installation of high-density storage racks at Koeberg spent fuel pool.

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 2005:

- 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

The NNR assessed the outcome of repair and replacement work performed on piping in safety systems at Koeberg as a result of the environmentally induced stress corrosion cracking phenomena and was satisfied with the programme of piping replacement and repair carried out by Eskom to restore these safety systems to acceptable level of integrity.

4.6 Probabilistic Risk Assessment

The NNR and Eskom participated in two workshops held over this period in Cape Town with the French and Belgian regulators. 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. This followed a series of earlier workshops conducted in 2002 and 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. A number of issues regarding electrical power supplies have however also been identified which are being addressed by Eskom and the NNR.

5. LICENSING OF KOEBERG REACTOR OPERATORS

The biennial evaluations of licensed operators, as required by the licence conditions, was completed at the end of 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. All operators passed the evaluations and were awarded licence extensions for another 2 years. The next biennial evaluations are scheduled for the third quarter of 2005.

6. RADIOACTIVE WASTE SAFETY

The generation of solid radioactive waste amounted to 75.81 m^3, drummed in metal drums, and 46.51 m^3 drummed in concrete drums. This compares to last year's figures of 86.94 and 37.38 m^3 respectively. The inventory of the drummed radioactive solid waste produced in 2004 appears in the following table. The comparable figures for 2003 are given in brackets

Table 2: Solid Radioactive Waste

Type of solid radioactive waste	No. of drums
C1 drums containing non-compressible waste	34 (24)
C1 drums containing concentrates	68 (48)
C1 drums containing resin	0 (18)
C2 drums containing resin	42 (15)
C4 drums containing filters	3 (9)
C2F drums containing filters	4 (4)
210 litre metal drums containing general trash	378 (336)
210 litre metal drums containing resin	108 (168)

Radioactive waste shipped to Vaalputs in 2004 (which does not directly relate to what has been generated by Koeberg during that year) amounted to 183 m^3 in steel drums and 51 m^3 in concrete drums. This compares to 50.40 and 69.85 m^3 reported last year for these quantities respectively.

7. TRANSPORT SAFETY

There were no incidents involving the transport of radioactive material and all consignments complied with safety requirements. A summary of transportation data is provided below:

Table 3: Transport Data

Fuel consignments on site	2
Radwaste consignments	52
Other materials (sealed sources) that were acquired during 2004	12

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 special guests (local and international) to witness and observe the activities, responses and actions of the various organizations that are involved in the emergency plan of the Koeberg Nuclear Power Station. The guests 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, and 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 prepared a report on its conclusions and recommendations and has circulated it to the participants in the exercise. The implementation of the corrective actions has been 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. Progress with the corrective actions is considered satisfactory.

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 a draft agreement. It is expected that this will be signed by the relevant authorities once the integration of the early and late phase aspects of the emergency plan has been completed and the City of Cape Town plan has been finalised.

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 has been completed and the requirements document is ready to be issued.

Further meetings will be held with the authorities to discuss the way forward in terms of the processes which the authorities have to develop in compliance with the regulation.

The NNR is confident that the introduction of this 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

AS reported in last year's annual report Eskom, in conjunction with the local authorities in Cape Town, has completed a 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

The process of integrating the early and late phase aspects of the emergency plan is under way.

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.

9. PHYSICAL SECURITY

The licensing requirements pertaining to physical security with 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. The NNR is presently in discussion with various government agencies involved in oversight of national key points for assistance to the NNR in terms of technical reviews of security related submissions from licensees.

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 the conditions of its licence.

Approximately 250 inspections were carried out by the NNR on Koeberg during this period as opposed to 400 reported in last year's annual report. The difference in number is mainly attributed to the difference in the number of plant refuelling outages undertaken by Eskom, during which many inspections are carried out by the NNR .There were two refuelling outages (one on each Koeberg unit) as reported in last year's report as opposed to only one refuelling outage (on one Koeberg unit) during this period.

A safety indicator system is used by the NNR to record and grade findings arising from the compliance assurance programme, inspections 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 the slow progress in closing out the findings of the periodic safety review of Koeberg. The CP-1 modifications referred to in section 4.2 will however partly address these outstanding issues.

During the reporting period three audits were performed, on the Upgraded Technical Specifications (UTS) project, emergency planning and the "Systematic Approach to Training" (SAT) for operator training. The findings and observations raised during these audits and their closure are monitored by the NNR at the regular licensing interaction meetings with Eskom.

INCIDENTS/OCCURRENCES

A total of 345 Problem Notifications (PNs) / occurrences were reported in the following categories:

Table 4: Problem notifications.

CATEGORY	NUMBER OF INCIDENTS / OCCURRENCES
1	14
2	12
3	319

Category 1 requires immediate notification to the NNR, Category 2 requires 24-hour notification and Category 3 requires notification within five working days.

Although a total of 345 PNs were reported at KNPS, none of these was significant in terms of the category of incidents and accidents as defined in the NNR Act.

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 (Electricité 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 related to the operability of one train of auxiliary feedwater to the steam generators of Unit 2.

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

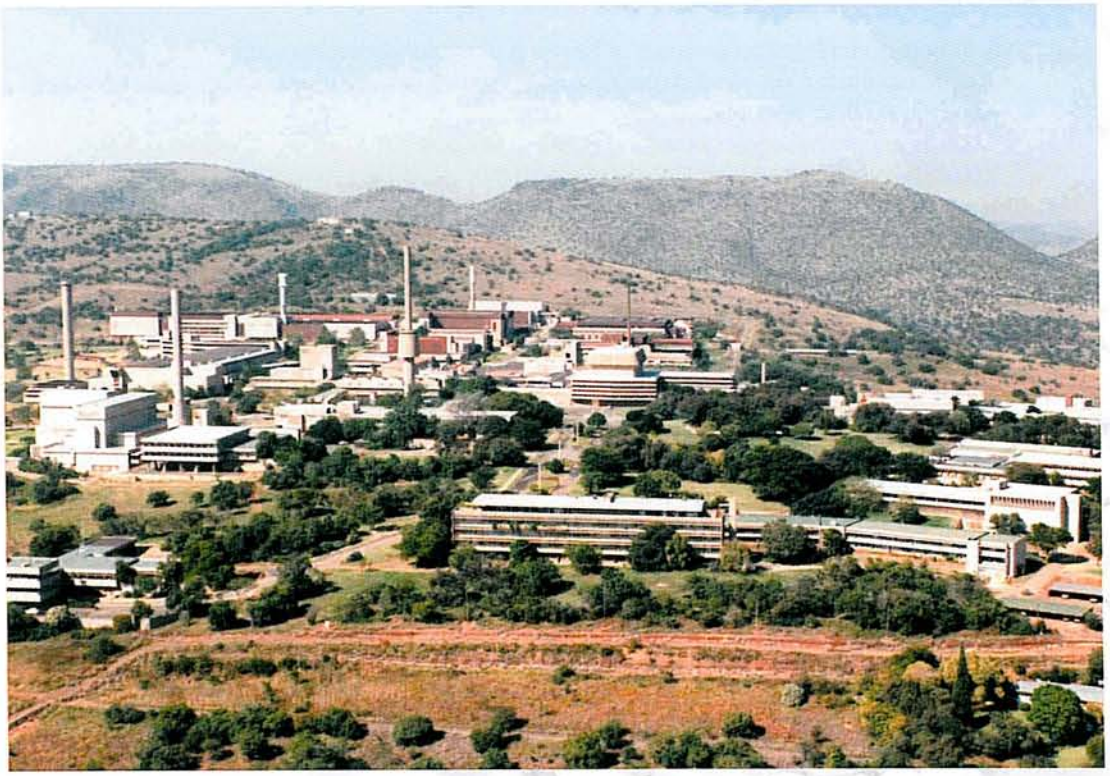


Figure 2: A view of the NECSA site towards the western side, with the SAFARI-1 Research Reactor in the centre.

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 persons in matters falling within these functions; and
- serve the State's nuclear institutional obligations.

The research reactor at Pelindaba, SAFARI-1, which has ISO-14001:1996 and 9001:2000 (applicable to the Quality Management System) accreditation is one of the most commercialised and highly utilised research reactors in the world.

Further, NECSA is also responsible for operation of the Vaalputs Radioactive Waste Disposal Facility in the Northern Cape Province.

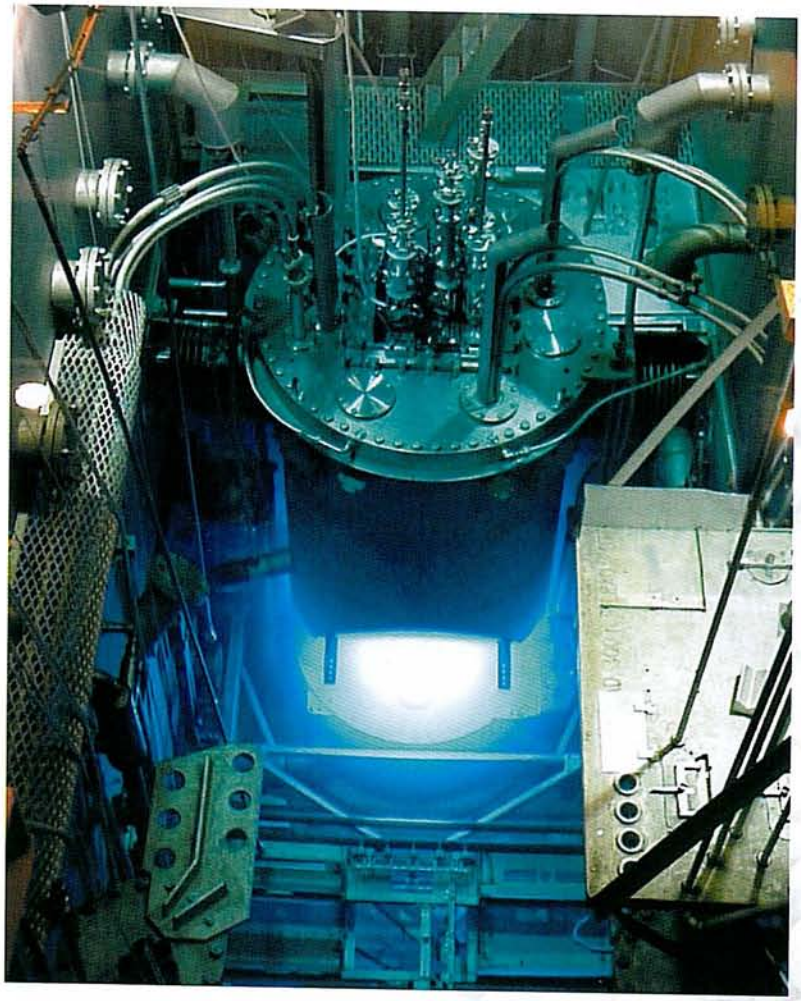


Figure 3. The SAFARI-1 Research Reactor

SAFETY ASSURANCE

1. OCCUPATIONAL EXPOSURE

The controls over occupational exposure were comparable to best international practice. The average effective radiation dose per occupationally exposed worker for the 2004 calendar year was 0,64 mSv, which is 12.8% of the ALARA objective of 5 $mSv.a^{-1}$.

The highest dose received by an individual in the calendar year was 10.7 mSv. The worker was exposed to radiation due to normal working conditions in the facility. The ALARA objective for maximum individual dose (20 $mSv.a^{-1}$) was therefore not exceeded for the calendar year 2004.

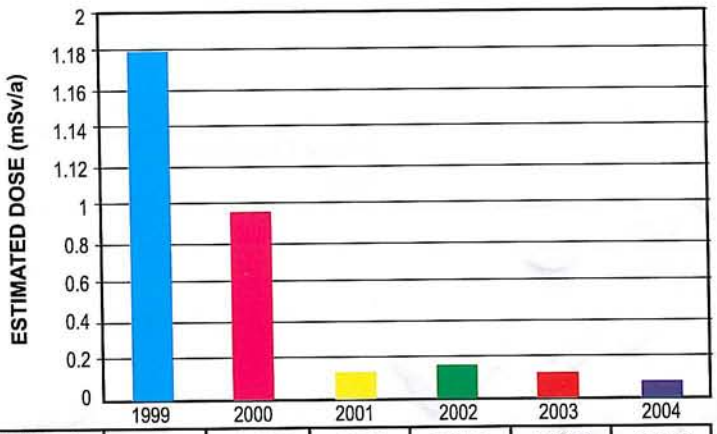
It should be noted that during the reporting period, regulatory control of the Isotope Centre, Lumitec and Sterisure, on the Pelindaba site were transferred from the NNR to the Directorate Radiation Control of the Department of Health due to the fact that these facilities work only with Group IV hazardous substances.

Table 5: Occupational Exposure for Necsa

Maximum Dose (mSv)	10.7
Average Dose (mSv)	0.64
Total Collective Dose (Person Sievert)	0.491

2. PUBLIC EXPOSURE

The projected public exposure arising from liquid and gaseous effluent discharges was calculated as 9,87 µSv, which is 3.95% of the annual dose limit of 250$µSv.a^{-1}$. Liquid effluent discharges accounted for 9.13 µSv and gaseous discharges accounted for 0.73 µSv for the 2004 calendar year. There were no safety concerns regarding public exposure to the community living around NECSA.



	1999	2000	2001	2002	2003	2004
Public Exposure due to Liquid Effluent Released to the Crocodile River	0.18	0.097	0.014	0.017	0.012	0.009

Figure 4: Public exposure due to liquid effluent releases to the Crocodile River for the past six 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, and
- water and fish samples from the Crocodile River and Hartbeespoort Dam

To ensure an appropriate level of radioactivity control in the environment, the NNR uses a system comprised 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.

4. NUCLEAR SAFETY

The NNR approved 63 licence change requests during the reporting period, as indicated in the following table:

Table 6: NECSA submissions approved by the NNR during 2004/2005

Type	Number
Safety assessments	25
Facility in-service inspection manuals	1
Radiation protection standards	18
Facility security manuals	5
Facility quality management manuals	1
Facility care and maintenance procedure	3
Transport containers (also revalidation of certificates, special form certificates & package design)	3
Facility decommissioning & decontamination procedures	5
Facility Emergency Plan	1
SAFARI-1 LEU Silicide submission	1
Total	63

5. RADIOACTIVE WASTE SAFETY

The total number of radioactive waste containers within the Pelstore, which is an under-roof centralised storage area of approximately 260m x 60m in Area 14 on the Pelindaba site, as at 31 December 2004 was 42487.

The following table reflects the radioactive waste generated and stored within the Pelstore during the reporting period:

Table 7: Radioactive waste generated by Necsa

Waste Type	Waste Container	No. of Containers
Medical Waste	100 L	103
Medical Waste	160 L	13
Solidified Waste	100 L	491
Safeguard Enriched	200 L	251
Compressive	160L	2595
Isotopes	100L	10
Industrial Waste	160 L	14
Total		**3477**
Spent Sources	-	2

In addition to the above, a total of 9064 drums were transferred from other temporary storage facilities on the NECSA site to the Pelstore during the reporting period. There were no safety concerns regarding radioactive waste management at NECSA (Pelindaba).

6. TRANSPORT SAFETY

During the reporting period the NNR approved a total of 3 new transport certificate for transporting radioactive sources. This approval added to 12 existing transport containers/certificate which are currently being used by the holder.

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 4 site emergency exercises and 59 building exercises were conducted by NECSA. These exercises tested various aspects of the NECSA site emergency plan, including possible chemical and radiological hazards.

NECSA demonstrated that it has the ability to respond to a major incident. However, some deficiencies were identified. These deficiencies were addressed in an action plan, which is being implemented. The implementation of the improvement actions is monitored by the NNR.

8. PHYSICAL SECURITY

In line with international developments in the area of physical security, the physical security arrangements at NECSA are being upgraded.

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, NECSA demonstrated acceptable compliance with the conditions of the licence.

INCIDENTS/OCCURRENCES

In accordance with the requirements of Licence Document LD-1001, 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 73 incidents/occurrences were reported during the financial year in the following categories:

Table 8: Problem Notification (Necsa)

CATEGORY	NUMBER OF INCIDENTS / OCCURRENCES
1	0
2	14
3	59

None of the above occurrences was classified as an incident or accident as defined in the National Nuclear Regulator Act, Act No. 47 of 1999.

VAALPUTS NATIONAL RADIOACTIVE WASTE DISPOSAL FACILITY

BACKGROUND

The Vaalputs National Radioactive Waste Disposal Facility is situated in the Northern Cape Province, approximately 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.



Figure 6: Concrete radioactive waste containers emplaced in Trench B01 before capping of the trench.

The climate is harsh and summer temperatures often exceed 40°C, while in winter freezing conditions and winds with a high chill factor are often experienced. 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 primarily 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.

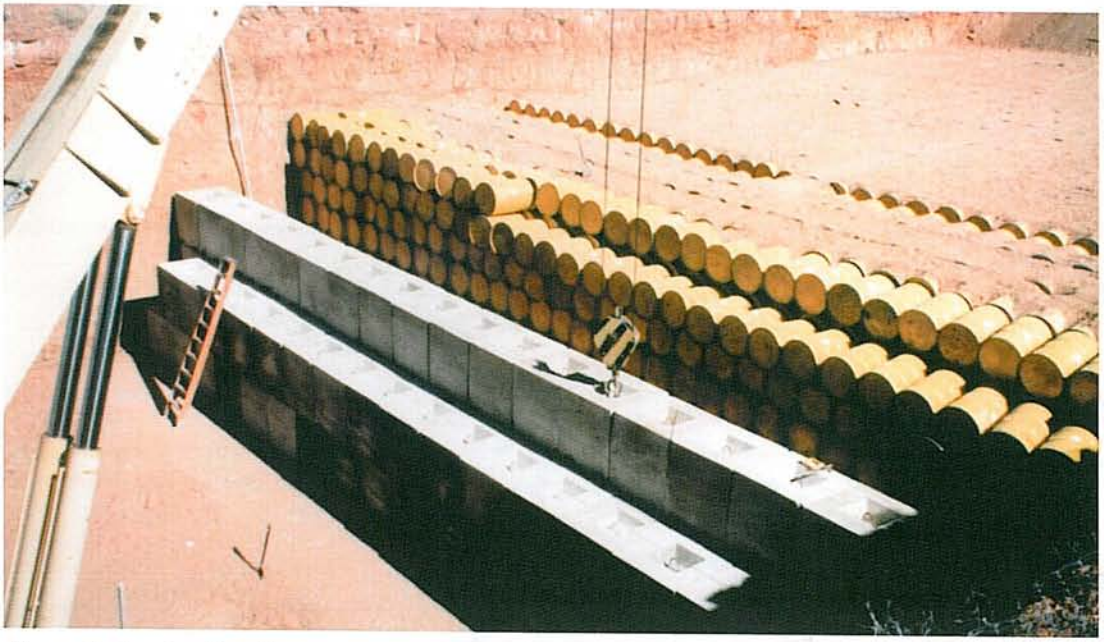


Figure 7: Metal radioactive waste containers emplaced in Trench A01 before capping of the trench.

SAFETY ASSURANCE

1. OCCUPATIONAL EXPOSURE

The controls over occupational exposure were comparable to best international practice. The average effective radiation dose per occupationally exposed worker for 2004 was 1,18 mSv.

Table 9: Occupational Exposure (Vaalputs)

Maximum Dose ($mSv.a^{-1}$)	2.29
Average Dose ($mSv.a^{-1}$)	1.18
Total Collective Dose (person-Sv)	0.013

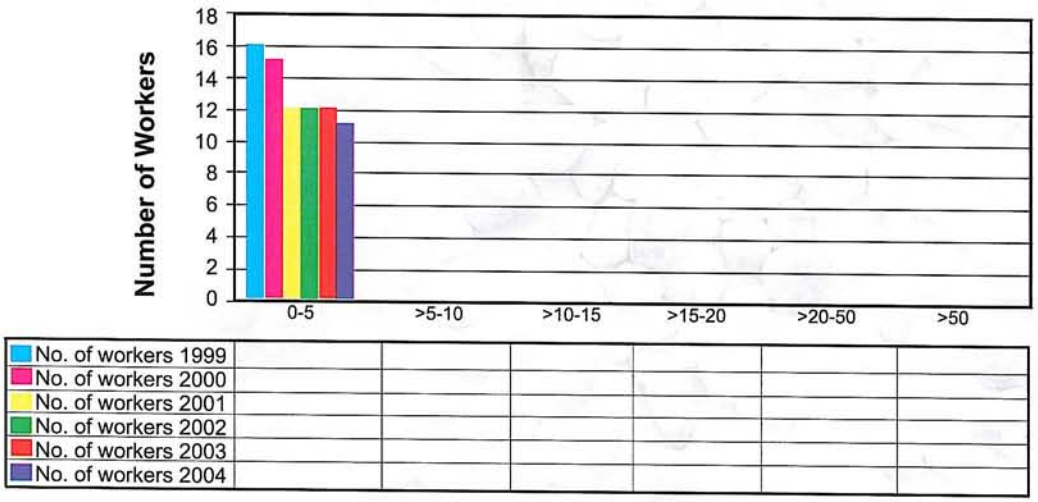


Figure 8: Distribution of occupational exposures for the past six years at Vaalputs

2. PUBLIC EXPOSURE

Based on the environmental surveillance programme 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. This programme is conducted to confirm that there have not been any releases into the environment from the Vaalputs site. Due to the climate in the area, where the evaporation rate is about 36 times higher than the rainfall, the monitoring programme is mainly focused on borehole water, soil and vegetation.

Most of the nuclides measured were below the lower level of detection of the analytical equipment. Detectable concentrations, mainly Uranium, 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

During the reporting period 54 shipments, consisting of 1205 radioactive waste packages, were received at Vaalputs from Koeberg for final disposal. The following table summarises the number and types of waste packages disposed:

Table 10: Radioactive waste shipped to Vaalputs

TYPE OF WASTE	AMOUNT	SHIPMENT
Concrete	100	20
Metal Drums	1080	9
Spent Fuel Racks	24	24
IP 2 Container	1	1
TOTAL	1205	54

The Vaalputs nuclide inventory, including the number of waste packages in each trench, as at 31 December 2004, is summarised in the following table:

Table 11: Vaalputs nuclear inventory

Trench	Number of Waste Packages	Total Activity Received and Decayed up to 31 December 2004	
		Total Activity Received to date (GBq)	Total Activity Corrected for Decay (GBq)
A01	7881	1.892 E +05	1.545 E +05
A02	840	4.070 E + 02	2.142 E +02
A03	1639	8.534 E +02	7.097 E +02
B01	2845	9.712 E +04	3.177 E +04
TOTAL	13205	2.876 E +05	1.872 E +05

Liquid Effluent Discharges

Following compliance with release criteria, 11.81 m^3 of liquid effluent was released in 5 batches from the low active sumps to the French drain during the reporting period.

Gaseous radioactive effluent release

The following table reflects the results from the ventilation outlet stacks at Vaalputs:

Table 12: Results from ventilation stacks (Vaalputs)

ACTIVITY MEASURED	TOTAL ACTIVITY (Bq)	% OF AADQ
Alpha	8.49 E + 03	1.02
Beta & Gamma	8.21 E + 04	0.48

5. INSPECTIONS AND AUDITS

NNR undertook inspections and audits at Vaalputs during the reporting period. The inspections and audits concluded that there was adequate compliance with the conditions of the licence.

The NNR is involved in meetings of the KNPS/NECSA joint working groups. These joint working groups aim to improve waste management systems from cradle to grave.

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 ore, tiles, fertilizer, glass, etc. The most common naturally occurring radionuclides in material 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 sufficiently 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 are not equipped or designed for radiological protection. Indeed, in the case of mines, the lack of appropriate design for radiological control in some mines results in overexposure of underground workers. The legacy of lack of radiation protection on NORM facilities has also led to the existence of contaminated sites/land throughout the country. An important challenge here is that the perpetrators cannot be easily identified.

Through the combined efforts between the Regulator and industry, it has become apparent that some consumer goods containing NORM, which have not traditionally been considered as a radiological problem, may require regulation, and this may have social and economic consequences. The transport and disposal of NORM are also a concern, particularly due to the large volumes that need to be considered.

To date the National Nuclear Regulator has issued 112 nuclear authorisations to NORM facilities (see table below) in comparison to previous year whose values are shown in brackets in the table below. Of the 112 nuclear authorisations, 16 were issued during the 2004/2005 financial year.

Table 13: Authorised facilities

Mine and mineral processing	54 (50)
Scrap smelters	2 (2)
Scrap processors	17 (10)
Small users	28 (28)
Refurbishers	2 (0)
Fertilizer manufacturers	4 (4)
Service providers	5 (2)
Total	112 (96)

Mining and mineral processing facilities include the production of minerals such as copper, gold, uranium, heavy minerals and phosphate rock. Service providers are authorised for the clean-up of sites contaminated with NORM residue. Scrap recyclers are mainly involved in the business of processing and selling scrap material 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 for verifying the viability of proposed mining projects.

With regard to contaminated sites, confirmatory surveys were conducted on 17 of the 41 contaminated sites during the reporting period. Twenty final closure reports were submitted to the NNR and of these, confirmatory inspections were conducted on 17 as mentioned above. A total of 13 interim reports were submitted during the reporting period, without the results of the radioanalysis reports from the soil samples taken.

SAFETY ASSURANCE

1. OCCUPATIONAL EXPOSURE

The Regulation of Natural Sources Programme continued to focus 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.

The table below portrays the successes achieved in reducing the number of workers exposed to radiation levels in excess of the dose limit. One of the factors that contributed to the improvement was the implementation of more rigorous compliance assurance measures by the NNR during 2002, 2003 and 2004 at those mines where dose limits had been exceeded. More frequent inspections were conducted and working groups were established at all of those mines in order to monitor the progress of the action plans developed by the mines to reduce occupational exposure. These action plans include the identification and implementation of engineering controls and the use of action levels to remove workers from high exposure areas. Only 3 persons exceeded the annual dose limit, by 0.6 mSv above the annual limit of 50 mSv, before they were relocated to areas where they would not be occupationally exposed to radiation. Activities of these working groups, which include representatives of the NNR, the mine, workers and the Mine Health and Safety Inspectorate, are ongoing.

Table 14: Number of workers exposed above the dose limit.

YEAR	NUMBER OF WORKERS ABOVE THE DOSE LIMIT
2001	7 931
2002	1 133
2003	424
2004	3

The following table compares the distribution of radiation doses to workers as reported by holders in their annual dose reports for the 2001, 2002, 2003 and 2004 calendar years.

Table 15: Distribution of worker doses

	0-10 mSv	10-20 mSv	20-50 mSv	>50 mSv
2001	118 881	30 701	25 578	7 931
2002	120 665	24 689	18799	1 133
2003	104 917	35 035	20 595	424
2004	105 111	30 123	20 345	3

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 the issues pertaining to the development of status reports. Activities of the working group are ongoing. The results show that there is no safety concern.

The holders are currently revising and submitting public safety assessments to the NNR as well as the associated radiation protection programme. The outcome of these safety assessments will highlight the improvement as a result of implementation of the radiation protection programme from the year 2000 to date.

3. RADIOACTIVE WASTE SAFETY

The table below reflects the disposal of radioactively contaminated waste by mining and minerals processing facilities during the 2004 calendar year.

The following figures are based on the annual waste reports received from holders to date.

Table 16: Radioactive waste (Mining and mineral processing facilities)

Form of Waste	Quantity (tons)
Liquid waste	1.29 E +09
Gaseous waste	6.26 E +11
Solid waste	4.23 E +07

4. TRANSPORT SAFETY

Routine shipments of low specific activity (LSA-1) scrap material occur daily between the authorized mines, scrap dealers and smelters. The mines reported that during the 2004 calendar year 600 such shipments took place. Additionally, 35 shipments of contaminated material took place between the mines and Nufcor. A further 20 such shipments were made from Nufcor to its clients, which are mostly abroad. These shipments were over land to a harbour and further by freight container. Two occurrences were reported on the shipment of U_3O_8 from Nufcor to Canada but were of minor significance. No other incidences of any significance were reported from any other shipments.

5. INSPECTIONS AND AUDITS

A total of 115 inspections were conducted during the reporting period and the information recorded on the internal databases. These 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 be exceeded and also on those mines where uranium and acid plants were being demolished. The number of non-compliances was as follows:

- 20 = category 1
- 17 = category 2

These categories are not used in the same sense as in the case of safety in reactors. In this usage category 1 refers to minor non compliance, category 2 refers to major non compliance.

The compliance index improved from 55% to 68% over the previous year.

During the reporting period the NNR embarked on a programme to train a number of its staff members as ISO9001:2000 auditors and lead auditors. Following their theoretical training and as part of gaining the required practical experience, these trainee NNR auditors conducted, under the supervision of a qualified lead auditor, a total of 9 formal audits at various mining facilities to ascertain the degree to which these mines were implementing quality management systems. The reports produced identified all the non-conformances that were raised and required action plans from the mines to implement corrective and preventive actions.

The audits revealed that the mines were lacking in terms of quality management systems.

OCCURRENCES/INCIDENTS

A total of 7 occurrences were reported by holders during the period. Two were regarded as Class 1 and related to those mines where workers were exposed to radiation levels that exceeded the annual dose limit of 50mSv during the 2004 calendar year. One occurrence related to an authorisation holder 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 were of lesser safety significance.

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 in July 2000. 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.

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 NNR Act 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 the 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.

NUCLEAR POWERED VESSEL LICENCE APPLICATION

In terms of section 21 of the NNR Act, the Naval and Air Adviser to the British High Commission in South Africa, on behalf of the British Royal Navy, made an application for a Nuclear Vessel Licence on 15 January 2004 to enable the nuclear powered vessel of the British Royal Navy, HMS TURBULENT, to visit the Simonstown naval base during the period 24 to 29 June 2004.

Taking into account the military secrecy which surrounds the divulging of details regarding design and operational technical information and the sovereignty attached to military vessels, the NNR developed a procedure, taking into account the relevant requirements of the NNR Act, for the review of such applications.

In accordance with the NNR Act, public comments were solicited in relation to the application. After reviewing the public representations received by the NNR, the NNR Board directed the Chief Executive Officer to grant the nuclear vessel licence. A Nuclear Vessel Licence – NVL 002 was issued to the applicant, the British High Commission, on 15 June 2004 for the visit of HMS TURBULENT to visit the Simonstown naval base from 24 June to 29 June 2004.

The NNR conducted independent radiological surveys in the vicinity of the vessel, e.g. water sampling and environmental radiation monitoring, prior to, during and after the vessel's visit. The results of the analyses of these water samples and radiation readings did not indicate any problems.

STANDARDS AND REGULATORY PRACTICES

REGULATORY RESEARCH DEPARTMENT

1. INVESTIGATIONS AND REGULATORY RESEARCH PROJECTS

The principal mandate of this department is to consolidate all research and development efforts to ensure that the NNR is kept abreast of national and international developments. The research work focuses on regulatory research on, for example, safety standards, regulatory requirements and guidance to be used in SA-specific conditions. 'Regulatory' research and development should be directed towards improved regulation of nuclear and radiation risk. The term 'research' in a wider context could include basic research or applied research. The NNR's focus is on applied research, which could entail investigations, desktop research, etc.

A number of research projects necessary to improve the regulatory effectiveness of the NNR are identified and undertaken annually. Summaries in terms of all projects are included below.

1.1 Iodine Prophylaxis

The request for the NNR position regarding the World Health Organization (WHO) recommendations on the lowering of doses for stable Iodine Prophylaxis intervention levels was raised at the Emergency Planning and Liaison Committee (EPLC) forum, now designated the Nuclear Emergency Planning and Response Oversight Committee (NEPROC).

In response to the request, the NNR initiated the research project, which aims to make available the latest information on the use of stable iodine prophylaxis in the context of radiation protection of the thyroid as part of emergency response and preparedness for nuclear accidents.

During the first phase of the project the NNR conducted a comparison on how different countries approach the intervention levels for distribution of stable iodine during nuclear emergency. The results of the first phase of this project showed that different national regulatory authorities have taken different views on the appropriate approach to the provision of stable iodine. It therefore became important that the NNR progress the project to the second phase, which is concerned with establishing a technical basis for any decision to change the current basis for stable Iodine intervention levels and distribution strategy.

Currently the work on Phase Two is in progress. Once completed, the outcomes will be discussed with all relevant stakeholders before changing the current doses for stable iodine prophylaxis intervention levels and the distribution strategy.

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

The local municipality and interested parties have expressed concern about the exposure levels to the public in Paarl. Paarl is situated about 60 km from Cape Town. When the Radiation Section of the Department of Health performed radon measurements at a few sites in Paarl about 10 years ago, it found elevated levels of radon and environmental radioactivity. Elevated levels were found in some of the older houses with presumably 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 were needed.

A study was commissioned through the Physics Department of the University of Western Cape, to investigate indoor radon levels in the area and the report is being finalised.

1.3 Radon Survey in the Cango Caves

Radon measurements were conducted in the Cango Caves, near Oudtshoorn, by the University of Western Cape. The purpose was to determine the levels of exposure to tour guides due to relatively longer time that they spend in the caves while conducting tours by visitors. The potential radiological hazard to visitors is considered to be insignificant, since they spend only about 2 hours for the longest tour of the caves.

Detailed report is being finalized.

1.4 Karoo Uranium-contaminated Sites

It came to the notice of the NNR that there are sites around Beaufort West and Laingsburg in the Karoo and Edenburg in the Free State which are contaminated with Naturally Occurring Radioactive Material (NORM). The contamination results from uranium prospecting that occurred in the late

1970s and early 1980s by different companies which then withdrew from the area after the uranium price dropped, without any remediation.

There are four sites of different size where this prospecting was conducted, namely Rystkuil (on farm Ryst Kuil), Rietkuil (on farm Rietkuil 307), DR-3 (on the farm Drie Vaderlandsche Rietvalleyen 49) and Mooifontein (on the farm Mooifontein 76). All these sites are remote from densely populated areas and are within the boundaries of farmlands; hence there is limited access and human activity.

Subsequent to receiving this information, the NNR conducted investigations at all the sites to verify the information in order to ensure that appropriate and informed actions could be taken to prevent potential radiological impact on the environment and to the public. Results of the investigations demonstrated that there are different uranium radioactivity concentrations in the ore.

Following these findings, the NNR informed the Department of Minerals and Energy and held meetings with all relevant stakeholders in order to investigate the possibility of rehabilitating the sites with State funds or instructing the holders of prospecting rights liable for rehabilitation.

The DME has recently undertaken to provide funds to rehabilitate the contaminated sites, and the NNR and DME are working jointly to rehabilitate them within the next two years.

1.5 Transport Incidents and Investigations

1.5.1 Incident of detected contamination

During this reporting period South African Marine Safety Authority informed the NNR of incidents with respect to the transport of radioactive material by sea.

A notification was received by the NNR in April 2004 concerning potential radioactive contamination in the cargo hold of the Tugela and Heemskerck ships which entered Cape Town harbour on 28 April 2004

The authorities in Le Havre informed the NNR that above-normal levels of radioactive emissions had been detected from the container storage area in the port. The source of these emissions was identified as emanating from uranium ore sand or dust sticking to the underside of one or more of a consignment of 10 containers. The uranium ore was initially loaded into the Tugela at Walvis Bay from Rossing Mine and subsequently loaded into the Heemskerck, which then transported the uranium ore.

The NNR sent a team of inspectors to monitor and investigate the prevalence of elevated levels of radioactive surface contamination reported on the hull. The team that conducted the inspection found localized areas of surface contamination and proceeded to remove the loose contamination from the hull. As per the assessment of the lead inspector, the surface contamination was removed and packaged and the activity levels of the hull restored to those of background levels. The contamination found on the ships' hulls is suspected to have been caused by a container that was loaded without adequate cleaning of its underside. In order to avoid similar incidents, Rossing Mine in Namibia undertook to ensure that containers are thoroughly cleaned and monitored before shipment.

1.5.2 Inspection held on board the BBC China off Grosvenor Point

In October 2004 the South African Maritime Safety Authority informed the NNR of a rumour concerning a ship, the "BBC China", carrying nuclear cargo. The ship had run aground off the South African coast. During a previous voyage she was found to be carrying mis-declared cargo, in the form of centrifuges capable of being used for uranium enrichment, and bound for Libya. As a result of this incident, on a subsequent voyage, she was searched by the United States authorities in Hawaii to determine if she was carrying any nuclear cargo which may have also been mis-declared. This search proved negative.

The NNR conducted an inspection of the ship in order to quell rumours that she was carrying nuclear material. Measurements on the ship by NNR inspectors revealed that the gamma radiation levels above the cargo hold covers on the port side to be of the order of 0.06 μSv/hr. Furthermore the gamma radiation levels on the port side, against the containers stacked on the bow, were also between 0.05 μSv/hr to 0.1 μSv/h. Two water samples were obtained and analysed and the results did not show any radioactivity.

Since individual containers could not be accessed it was impossible to say whether or not there may have been a container carrying some radioactively contaminated item. It could only be concluded that there were no gamma radiation levels significantly above background. Insignificant activity was also detected in the water.

1.6 Identification of actions involving naturally occurring radioactive material in South Africa

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 natural radioactivity (NORM), can be hazardous to the environment and human health. Accordingly, one of the functions of government is to establish legislation and promulgate

regulations to control activities involving radioactivity. It is important to develop criteria that can be used to assess levels of potential hazard (risk) in such activities. In South Africa, as in other countries, an important principle is that of authorisation or licensing, by way of Certificates of Registration or Nuclear Installation Licenses respectively. Many different activities carried out in South Africa involve naturally occurring radioactive materials (NORM) with different activity levels. Some of these activities or actions could possibly pose hazards to workers or to the public. This project is focused on the relationship between the radioactivity levels and the kinds of radio-isotopes present in the materials handled in a particular industry and the potential hazard in terms of human exposure. The object is to contribute to the improvement of criteria for the authorisation of actions.

This project will as its first phase develop a protocol based on research conducted in one mine. The protocol will then be applied in all mines within a particular industry. The next phase of the project will broaden consideration to other practices that may not necessarily be mines.

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 Act and to recommend the extent of assessment required, if any, and to determine the need for authorization of facilities.

2. DEVELOPMENTAL WORK

2.1 Development of Standards

International

To regulate the peaceful uses of 'atomic energy' internationally, the IAEA was founded under the auspices of the UN and headquartered in Vienna in neutral Austria. The IAEA is currently active in a number of fields such as the peaceful uses of nuclear techniques, the monitoring of the Nuclear Non-proliferation Treaty, and also, for example, in the harmonization of radiation protection (RP) measures and standards worldwide. In this it follows the recommendations of the International Commission on Radiological Protection which are based among others on United Nations Scientific Committee on Effects of Atomic Radiation reports and the analysis of health effects on the Japanese atomic bomb survivors, a study which is still proceeding. The IAEA has its own structures to enforce the Non-proliferation Treaty and its own RP section to assist inspectors with the necessary external and internal dosimetry. This section is also geared to the needs of Member States regarding the establishment of regulatory and RP legislation, and provides relevant assistance if the Member State is willing to accept the IAEA standards in this regard. Consistency in worldwide regulation has become a priority, mainly because the nuclear waste in many countries comes from a variety of sources and applications. The IAEA prefers the national regulating body to be independent of the organization that promotes nuclear applications in that country.

The IAEA publishes a large volume of documentation on nuclear and radiation safety, arranged according to Fundamentals, Standards and Guides in the fields of applications, radiation safety and nuclear (reactor) safety, relying on experts from Member States to assist in the drafting.

One of the statutory functions of the IAEA is to establish and adopt standards of safety for the protection of health, life and property in the development and application of nuclear energy for peaceful purposes and to provide for the application of these standards within the relevant operations. The following bodies oversee the development of safety standards:

- The Commission for Safety Standards (CSS) – a standing body of senior government officials holding national responsibilities for establishing standards and other regulatory documents relevant to nuclear, radiation, waste and transport safety
- The Nuclear Safety Standards Committee (NUSSC);
- The Radiation Safety Standards Committee (RASSC);
- The Transport Safety Standards Committee (TRANSSC); and
- The Waste Safety Standards Committee (WASSC).

The NNR has representatives of three of these committees.

During the present 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. Experience and information from the IAEA standard documents are continuously used in developing NNR regulatory documents including the standards.

2.2 National Standards Development

In terms of section 36 of the NNR Act the safety standards were published in the Government Gazette in June 2003 for public comment before promulgation. The next step towards finalisation of this document is now with DME.

3. COOPERATIVE GOVERNANCE AGREEMENTS

Regulations and activities of the NNR in pursuance of its vital responsibility to protect persons, property and the environment against radioactive nuclear hazards unavoidably impinges on the fields of responsibility of other 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 their maximum ability and in minimizing the duplication of such functions. Section 6(3) of the NNR Act requires regulations to be published on co-operative governance, in order to exercise cooperative governance with other state departments on issues in nuclear and radiation safety. 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.

Agreements with Department of Labour and Department of Water Affairs and Forestry were published in the Government Gazette of 27 August 2004. Work is proceeding to finalize the publication of agreements with Directorate Radiation Control of the Department of Health, and the three agreements with the Department of Minerals and Energy, namely Mine Health and Safety Inspectorate, Electricity and Nuclear Directorate, and Mineral Development Directorate.

4. REGULATORY PHILOSOPHY APPROACH

Further improvement was initiated on the NNR's regulatory philosophy and practices document, taking into account international developments and best practices.

The purpose of the document is to consolidate the regulatory philosophy and all key regulatory practices in a single document. The document provides brief information on the way in which the NNR applies its regulatory mandate.

The document addresses:

- Regulatory philosophy
- Key NNR regulatory objects in the NNR Act
- Record of decision (ROD)
- NNR enforcement principles
- Accountability principles
- Validity period of NNR authorisations
- Periodic safety review (PSR)

5. TECHNICAL SERVICES

5.1 Laboratory and Instrumentation

The NNR collects environmental samples around NECSA Pelindaba, Koeberg Nuclear Power Station and mineral processing facilities on an annual basis as part of its independent verification programme in order to ensure that all regulated facilities comply with the regulatory limits. The samples are analysed in the NNR laboratory. The analysis results in the reporting year indicate that regulated facilities comply and that no significant levels of radioactivity were detected in the environment.

The NNR has a range of portable radiation monitors, which are used during compliance assurance inspections, verification surveys, land clearance and emergencies. The availability of appropriate portable instrumentation has enabled the NNR to release some contaminated sites from regulatory control following cleanup.

6. EXTERNAL CAPACITY BUILDING

Science and technology is critical to the future of SA. It is necessary to ensure that as many people as possible master modern technology and integrate it into our society. It is also necessary to devote the necessary resources to scientific and technological research and development. There is increasing evidence that South Africa's progress in producing sufficient scientists, engineers and technologists is not yet satisfactory. A number of interventions are thus necessary to strengthen the transformation of our science and technology capacity to achieve increased numbers of people working in key fields of importance to the future. With these factors in mind the NNR's Regulatory Research Department has been actively involved in providing lectures and in the supervision of students of the University of North West doing their masters degree in Applied Radiation and Science Technology. The projects of the students supervised are as follows:

Student research project

The NNR supervised an MSc student as part of capacity building on the project titled: Determination of bioaccumulation factors for various types of fish in streams contaminated by low levels of radioactive material.

The South African environment and fish species are different from those elsewhere. The consumption of fish by different critical groups is often used to determine the annual effective dose to members of the public. In order to accurately determine the dose, bioaccumulation factors are essential. The lack of bioaccumulation factors (BAFs) relevant to various countries has led to the determination of annual effective doses to members of the public being regarded as dubious. This uncertainty is due to the use of default BAFs that have been derived internationally in an environment and with species that are different from those of South Africa. BAF is a parameter required when estimating the annual effective dose to members of the public from the consumption of fish living in contaminated surface waters. The student instituted the study to determine these Bioaccumulation Factors for various types of fish in streams contaminated by low levels of radioactive materials from selected mining and mineral processing facilities around South Africa.

The conclusion from the study was that the BAFs are site-specific, i.e. they depend on the type of organism as well the environment in which the organism occurs. Hence in order to have realistic BAF values, they should be determined on the basis of a particular study area.

7. INTERNATIONAL LIAISON

NNR employees have undertaken several information exchange visits to overseas regulators under the framework of bilateral agreements. This exchange programme is aimed at acquiring information on various regulatory matters to ensure consistency with internationally acceptable practices and to gain experience in terms of their regulatory approach.

Information exchange requests on various topical issues were sent to other regulators during the review year, and useful information was gained to further strengthen the development of the NNR approach on important regulatory matters.



COMMUNICATIONS AND OUTREACH INITIATIVE

KOEBERG ENVIRONS DEVELOPMENT COMMITTEE (KEDC)

The purpose of the Nuclear Emergency Preparedness Regulatory Oversight Committee (NEPROC) is to provide oversight on compliance with regulations pertaining to the Koeberg Emergency Plan and regional developments which impact on it.

Four meetings of the Koeberg Environs Development Committee (KEDC), chaired by the NNR, 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 ensure that the Koeberg emergency plan remains viable, were discussed at these meetings

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 at these meetings. In view of the close linkage between urban development and the Koeberg emergency plan, and for efficiency, the EPLC and KEDC were merged into one forum. The purpose of this forum is 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 requirements on developments in the vicinity of Koeberg, monitoring the initiation of the development of the late phase aspects of the Koeberg emergency plan, reporting and follow-up on emergency exercises, and follow-up on specific international issues such as intervention levels for the distribution of potassium iodate pills.

MEETING BETWEEN THE NNR AND LABOUR UNIONS REPRESENTATIVES AT KOEBERG

The purpose of these meetings is to discuss matters of mutual interest or concern relating to nuclear safety and public communication. Three 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:

- Emergency exercises – performance of workers at Koeberg in the exercises
- Control Zone Access and medical examinations
- Outsourcing to contractors
- 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 that follows an application. Based on the public representations made to the NNR following the publication and serving of the PBMR licence application in January 2001, the NNR Board decided that, public hearings would take place following a positive Record of Decision (ROD) on the Environmental Impact Assessment (EIA). ,The revised PBMR safety case in support of the application for the licence would also need to have been submitted to, and initially reviewed by the NNR.

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

The 7th bilateral meeting between the South African NNR and the French DGSNR (General Directorate of Nuclear Safety and Radiation Protection) /IRSN (Institute of Radiation Protection and Nuclear Safety) was held on 1-2 September 2004 at the NNR Head Office in Centurion and the NNR Site Office in Duynefontein near Cape Town. At these meetings topics related to regulatory practices, Pressurised Water Reactors (PWR) (Koeberg design), emergency planning, and research reactors were discussed.

Mr Chris Beyers attended the joint NEA/IAEA meeting to exchange information on recent events in nuclear power plants and the annual meeting of Incident Reporting System (IRS) national coordinators held in Vienna in September 2004.

Dr T Hill attended the IAEA INSAG meetings (International Nuclear Safety Group) held in April and November 2004 at the IAEA, Vienna. One of the objectives of this group is to bring about closer harmonisation of nuclear safety standards internationally.

Mr G A Clapisson attended the organisational meeting of the IAEA Convention on Nuclear Safety from 28-30 September 2004 at the IAEA offices in Vienna. The main purpose of this organisational meeting was for the Contracting Parties to this convention to discuss and finalise the arrangements for the 3rd CNS Review Meeting to be held in April 2005, e.g. formation of country groups, the agenda for the CNS review meeting, process for dealing with questions/answers on national reports etc.

ORGANIZATIONAL STRUCTURE OF THE NNR

APPROVED STAFF COMPLEMENT OF THE REGULATOR

Chief Executive Officer	1
Senior Management	5
Programme or Departmental Management	8
Process /Functional Sub-group Coordination	9
Regulatory Officials and Specialists (all levels)	44
Administrative, Secretarial and Support staff	19
	86

EMPLOYMENT EQUITY

Representativity - total staff

A) TOTAL NNR COMPOSITION

White males	22	(30.5%)
Black males	27	(37.5%)
White females	11	(15%)
Black females	12	(17%)
	72	
Disabled	2*	(2.7)

* One other disabled person is an intern who is a Receptionist

B) COMPOSITION OF STAFF BY RACE

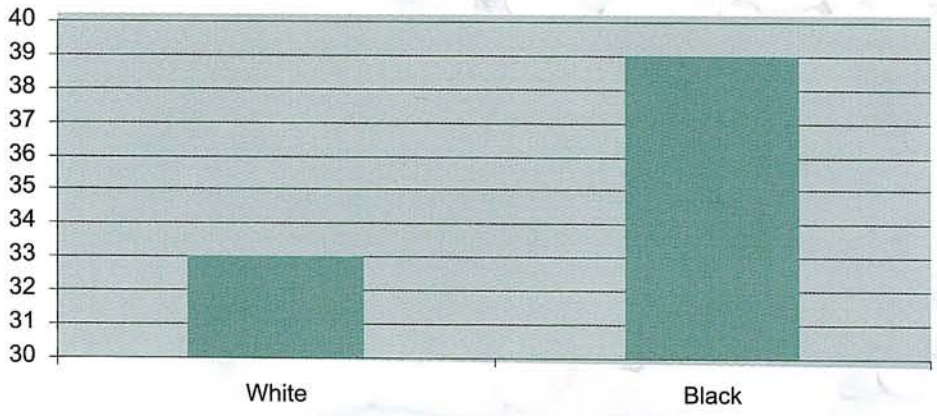


Figure 9: Staff composition by race

C) COMPOSITION OF STAFF BY GENDER

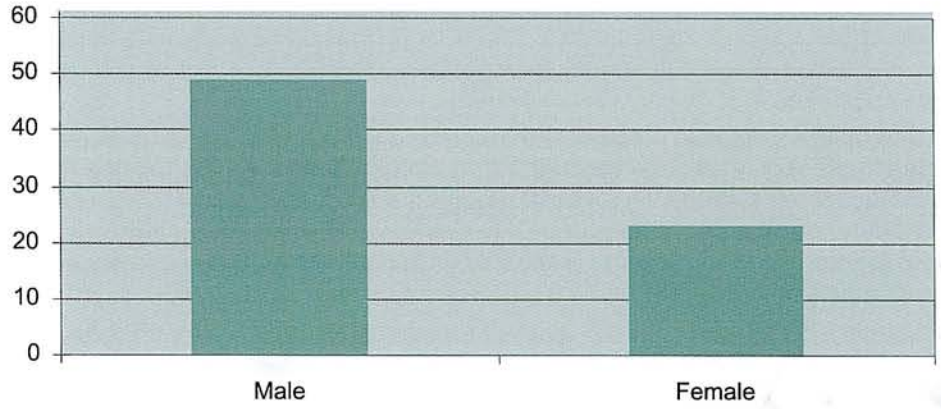


Figure 10: Staff composition by gender

D) MANAGEMENT

Top management

White males	1	(25%)
Black males	3	(75%)
White females	0	(0%)
Black females	0	(0%)
Disabled	0	(0%)
	4	

Senior Management

White males	2	(28.6%)
Black males	4	(57.1%
White females	0	(0%)
Black females	1	(14.3%)
	7	
Disabled	2	(28.6%)

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 consequential lack of interest of new professionals from designated group to engage 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 different capacity building interventions.

Staff Qualifications

Qualifications	Number of staff
Doctorate	4
Masters	23
Honours	16
Baccalaureate	4
Diploma	11
Matric	12
Sub-matric	2
	72

STAFF TRAINING AND DEVELOPMENT

The NNR continues to look for ways to train and develop staff in order carry out the mandate of the NNR successfully. Training and development of staff is regarded in a very serious light and this is why it has allocated approximately 9% of its personnel budget to staff training and development. Priorities in allocating resources for training and development gave specific emphasis to the accelerated training of staff from the designated groups.

In an effort to achieve the training objective, for example, the NNR, through its participation in the Science and Technology Education Fund (STEF), a skills development and funding initiative by NECSA, NNR, ESKOM, PBMR and AREVA (France), sent an additional 4 of its employees in June/July 2004 to attend a course in nuclear safety in France. The training which was offered by Framatome in France to this group was in the area of Reactor Safety Analysis, Neutronics and Accidents (from 6 June to 4 July 2004).

The training is intended to give an overview about all the main issues dealing with PWR design and operation. The objective is to give the trainees a thorough understanding of the physical phenomena governing a PWR reactor, a good knowledge of the systems, and to develop the safety culture needed to work in the nuclear field.

BURSARY SCHEME

Another avenue where the organisation makes effort to develop skills in order to prepare the industry for succession and replacement of departing expertise has been to continue to provide bursaries to students in engineering and science studies. During the reporting period four (4) students were allocated bursaries. 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 (2 x University of North West)
3) Nuclear Physics (1 x University of KwaZulu-Natal)

INTERNSHIP PROGRAMME

The internship programme called NYALUSO (a Venda name for development) which continues to help learners to acquire the experience and skills they need to enter and duly participate in the labour market is ongoing.

This programme has helped the National Nuclear Regulator to contribute to the creation of national skills pool in nuclear regulation and control matters in South Africa. The interns intake grew from 3 in 2003 to 12 in 2004. They cover areas of mechanical engineering, radiation protection and legal services. These interns have attended training programmes both locally and internationally, for example, in the Framatome Training Programme in France.

UNIVERSITY INVOLVEMENT

Post-graduate course in nuclear safety

The NNR is continuing its support of the post-graduate course in nuclear safety at the University of the Witwatersrand. The course was is mainly at training staff who will work on the PBMR project. The course is developed and presented by the NNR, NECSA, Eskom and the Pebble Bed Modular Reactor Company (Pty) Ltd. It is facilitated through the University of the Witwatersrand. It began in July 2004. Staff continue to provide lectures in support of the course.

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

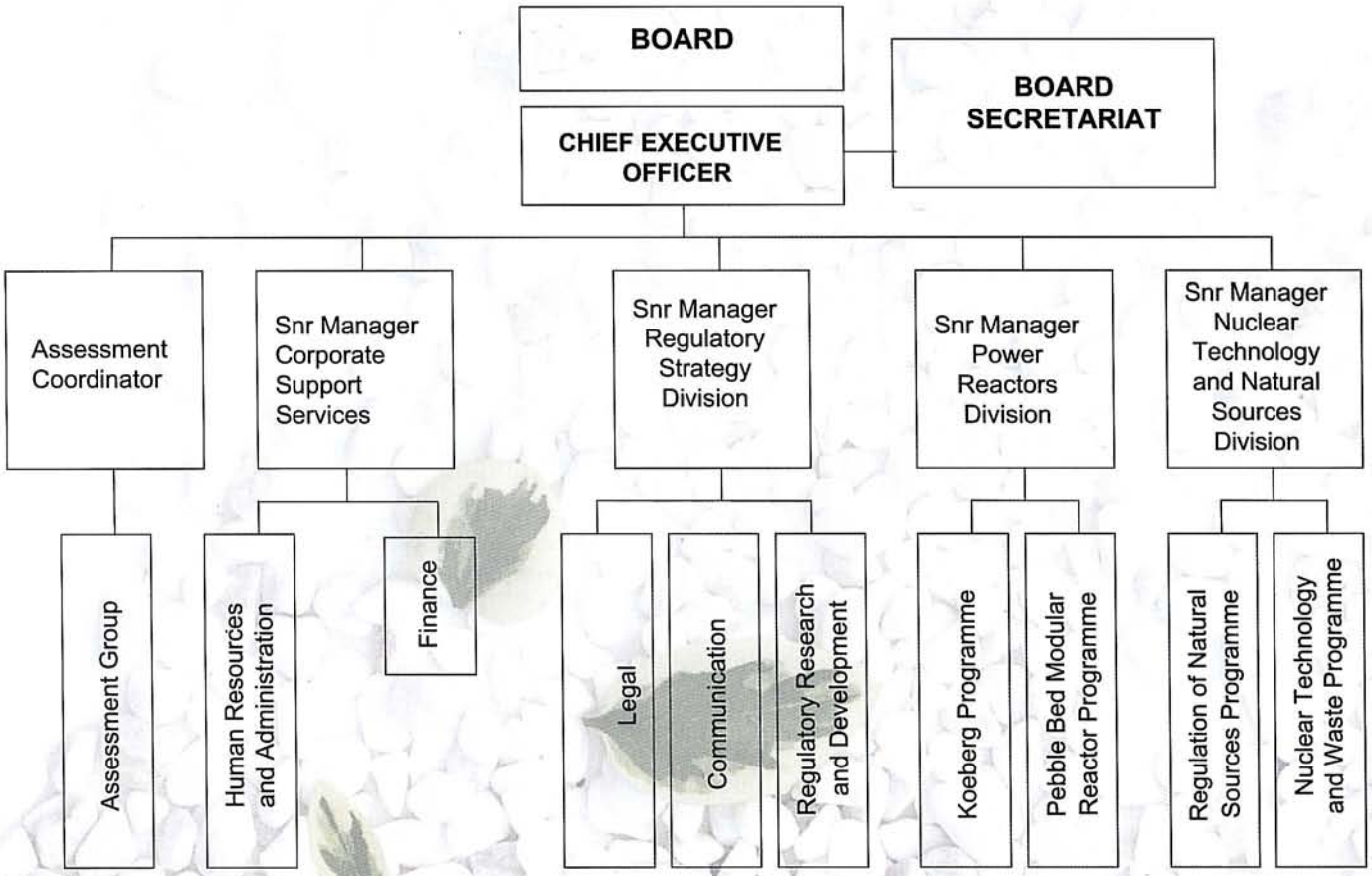
The NNR is continuing to provide technical and administrative support to the post-graduate course in radiation science at the University of the North-West. NNR staff is providing supervision of post-graduate students who are engaged in the Master Programme in Radiation Science.

TRANSFORMATION POLICY AND PLAN

Over the past two years, the NNR has focussed on making changes to improve every aspect of the business. Focus has been on making those changes that are within the framework of current legislation. There is steady progress toward achievement of the transformation priorities.

- Improvement of Service Delivery and Standards has seen progress. The NNR has continued to use the customised Balanced Scorecard as an organisational performance system.
- The alignment of Workplace Policies and Procedures with Democratic Values has been progressed aggressively. There is a continuous review and development of new human resource and finance policies.
- The NNR continues to report to the Department of Labour on the implementation of its Employment Equity Policy and Plan and the Skills Plan with ESETA
- The building of capacity has been accelerated through overseas and local training, mentoring , internship and conference attendance
- Participation and Consultation has shown remarkable improvement. There are two unions (UASA and NEHAWU). Staff continue to participate in the different human resource committees in the NNR. For example, the Training and Development, HIV/AIDS, Employment Equity Monitoring, Health and Safety Committees.

The Transformation Policy and Plan that was developed in 2001 is still relevant and therefore being implemented. It continues to inform the direction of the NNR's Strategic Plan for 2005/6.



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 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 Auditor-General's report appears on page 41.

The annual financial statements have been prepared in accordance with Statements of Generally Accepted Accounting Practice and the Companies Act. 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 1 April 2004 to 31 March 2005. The directors are of the opinion that the Regulator's systems of internal control and risk management were effective for the period under review. Notwithstanding that further improvements are being implemented.

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 2005 and the results of its operations and cash flow information for the year.

The annual financial statements for the year ended 31 March 2005, set out on pages 54 to 67, were approved by the Audit and Risk Management Committee, on behalf of 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 2005, and are signed on its behalf by:

K BHARUTH-RAM
Chairperson

DR S A TSELA
Acting Chief Executive Officer

Report of the Auditor-General to Parliament on the Financial Statements of the National Nuclear Regulator (NNR) for the year ended 31 March 2005

1. AUDIT ASSIGNMENT

The financial statements as set out on pages 54 to 67, for the year ended 31 March 2005, 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 4 and 20 of the Public Audit Act, 2004 (Act No. 25 of 2004) 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 officer. My responsibility is to express an opinion on these financial statements, based on the audit.

2. NATURE AND SCOPE

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.

The audit was completed in accordance with Auditor-General Directive No. 1 of 2005.

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 2005 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 Management Act, 1999 (Act No. 1 of 1999)

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

- Section 51(1)(a)(i) of the Public Finance Management Act, 1999 (Act No. 1 of 1999) requires that an entity has and maintains effective and efficient systems of internal control. Although controls are in place within the NNR they are not operating effectively regarding debtors, creditors and human resource policies as well as maintenance of the safeguarding of assets. This is further aggravated by the lack of segregation of duties between the debtors and creditors clerk as well as the accountant responsible for bank reconciliations and initialisation of payments on the Accpac system.
- Section 50(3)(a) of the Public Finance Management Act, 1999 (Act No. 1 of 1999) requires that a member of an accounting authority must disclose to the accounting authority any direct or indirect personal or private business interest that that member or any spouse, partner or close family member may have in any matter before the accounting authority. Not all the interests of the Board members and Audit Committee members were declared in the register of interest.

4.2 Declaration of interest of senior employees

According to paragraph 17 of the Conditions of Service, AD-1000, no officer or employee shall undertake any work against remuneration or act as a director or manager or be a partner in any business undertaking without disclosing this information in writing. Not all the interests were declared in the register of interest by the employees of the National Nuclear Regulator.

5. APPRECIATION

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

BR Wheeler for Auditor-General

Pretoria

31 July 2005

AUDITOR-GENERAL

REPORT OF THE AUDIT AND RISK COMMITTEE for the year ended 31 MARCH 2005

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;
- recommending the appointment of a new firm to perform the internal audit function;
- encouraging improved coordination and liaison between board committees in those areas where their responsibilities overlap.

The Audit and Risk Committee notes that, although further improvement is still needed, during the past year there has been an improvement in the internal controls and financial management systems. The Committee 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 2005 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), together with the associated Treasury Regulations, and South African Statements of Generally Accepted Accounting Practice.

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.



Chairman
21 July 2005

Committee members:
Dr JM Stewart (Chairman)
Ms T Mashanda
Adv B Mkhize
Mr B Hawksworth

DIRECTORS' REPORT

1. 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 2005. The annual financial statements have been prepared on the going concern basis since the directors have every reason to believe that the company has adequate resources in place to continue in operation for the foreseeable future.

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.

2. BOARD OF DIRECTORS - 1 APRIL 2004 – 31 MARCH 2005

Non-Executive Directors

Mr G Aboobaker
Prof K Bharuth-Ram (Chairperson)
Dr S W P de Waal – resigned 27 October 2004
Mr D Elbrecht
Rev P Grove
Ms T Mgoduso
Mr AHCH Motaung
Adv B Mkhize
Dr JM Stewart
Dr JM Matjila
Dr T Lesoli
Ms T Mashanda

EXECUTIVE DIRECTORS

Adv LB Zondo (Chief Executive Officer) – term ended 30 November 2004
Dr S A Tsela – (Acting Chief Executive Officer) – from 01 December to 31 March 2005

CHANGES IN MEMBERSHIP

Dr S W P de Waal – resigned in October 2004

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.

Directors	Board	Audit And Risk Management Committee	Finance Committee	Transformation and Development Committee
Number of meetings	6	9 (3 special meetings)	6 (2 special meetings)	6
Directors	**Number of Board and committee meetings attended per director**			
G Aboobaker	4	-	-	4
K Bharuth - Ram	6	-	-	-
S W P de Waal[1]	3	-	-	-
D P Elbrecht	6	-	6	-
P Grove[2]	4	-	-	-
B M Hawksworth*	-	6	-	-
T Kumalo (Alternate)	2	-	-	-
T Lesoli	6	1	-	6
T Mashanda	4	4	5	-
J Matjil	1	-	-	-
T Mgoduso	5	-	-	2
B M Mkhize	5	9	-	6
H Motaung	3	-	-	1
H Motaung	5	-	-	4
J M Stewart	6	9	-	-
T Zungu (Alternate)	2	-	5	-
L Zondo[3]	4	6	3	4
S A Tsela[4]	2	3	2	2

(Footnotes)

1 *S W P de Waal resigned from the Board in October 2004*
2 *P Grove was appointed in July 2004*
3 *L Zondo's term of office expired in November 2004*
4 *S A Tsela was appointed as Acting Chief Executive Officer from 01 December 2004 to March 2005*
* *B M Hawksworth resigned in January 2005*

3. 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.

4. OPERATING RESULTS

The operating surplus of R5,491,684 for the year is mainly due to the savings in personnel expenditure related to unfilled posts.

5. REVIEW OF OPERATIONS

The total income for the NNR is R52,598 (2004: R48,705 million) including the Government Grant of R8,067 (2004: R7,610 million) and the operating costs amount to R47,106 million (2004:R46,137 million)

6. 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.

7. 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

8. 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 was approved by the executive authority.

9. 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 onMinerals and Energy, the DME) and organized labour. The NNR also maintained relations with other strategic cooperatives such as the media, NGO's, international organizations, nuclear regulatory authorities in other countries, and the general public.

10. SHAREHOLDER RELATIONS

The NNR reported and discussed with the Executive Authority significant events. 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.

11. 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 students for nuclear-related training courses in France. The training courses were conducted under the auspices of the French nuclear company; Framatome.

12. 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
Postal address	:	PO Box 7106 Centurion 0046
Telephone	:	(012) 674 7100
Facsimile	:	(012) 663 5513
Email	:	nnr@nnr.co.za

REPORT ON PERFORMANCE AGAINST OBJECTIVES

A. CORE BUSINESS

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
1. To grant or refuse authorizations of new actions and approval of changes to existing actions	Executive report listing • Initial responses to all applicants within 4 weeks giving proposed timing of the review process • Completed application within the proposed timing • Explanation of instances where either of the above was not possible	Report	Report as part of main body of the annual report	Achieved	
	RENS	Average of < 90 days	RENS Average of 70 days	Achieved	There has been an improvement since the last financial year.
	NTWP	Average of < 90 days	NTWP Average of 139 days	Not Achieved	Represents average response time for all submissions including LCR's, routine reports and occurrences. The average response time for LCR's was 111 days and that for occurrence close out was 182 days.
	KNPS	Average of < 90 days	KNPS 64 days	Achieved	Although the average response time is less than the target of 90 days, scope for improvement has been identified.
	PBMR	PBMR SAR – 1 YEAR	PBMR 55 days	Achieved	
2. To regulate the optimal reduction of public and workers' doses and risk for all facilities according to the ALARA principle	Report on contaminated sites identified	38 close out reports	29/38 close out reports	Not Achieved	Some delays were experienced.
	Report on verification of rehabilitation of contaminated sites	Verification on 29 cleaned up sites	17/29 confirmatory surveys	Not Achieved	To be completed in the financial year 2005/6

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
	Report on actions to be authorised investigated	Report	Report at draft stage and 90% complete	Not Achieved	To be completed in the financial year 2005/6
	Reports on (Illegal) operations with potential radiological hazards identified	Report	Report	Achieved	
	Policy on application of risk criteria to different holders developed	Policy document	Draft form	Not achieved	To be completed in the financial year 2005/6
	Strategy for regulatory control (standard, assessment, compliance inspection) over Physical security measures developed and implemented	Strategy report	Report	Achieved	
	Strategy for regulatory control (standard, assessment, compliance inspection) over Safety and security of sources measures developed and implemented	Strategy report	Report	Achieved	
	Operationalized IAEA regulations for safe transport of radioactive material as national competent authority in respect of the matters falling in Act	Document on operationalised IAEA regulations	Process initiated but not progressed further	Not achieved	
	Public dose (Limit – 1 mSv/a)	Necsa NNR ALARA target of 0.050 mSv/a	0.009 mSv/a	Achieved	These dose values are based on calculated annual estimations. They are not actual dose values received by members of the public.
		Vaalputs NNR ALARA target of 0.005 mSv/a	0. 00 mSv/a	Achieved	
		KNPS NNR ALARA Target of 0.010 mSv/a	0.009 mSv/a	Achieved	
	Worker dose (Limit is 50 mSv/a)	Necsa NNR ALARA limit on Maximum individual dose 50mSv/a	10.70 mSv/a	Achieved	

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
		Necsa Average individual Dose NNR ALARA Target 5mSv/a	0.64 mSv/a	Achieved	
		Vaalputs NNR ALARA limit on Maximum individual dose of 50 mSv/a	2.29 mSv/a	Achieved	
		Vaalputs Average individual Dose NNR ALARA Target 5mSv/a	1.18 mSv/a	Achieved	
		RENS Maximum individual dose 50 mSv/a	Special case mines: 57.9 mSv/a Other mines: 42. 35 mSv/a Other facilities: 2.4 mSv/a	Not Achieved Achieved Achieved	There has been a marked improvement in the maximum doses received from 125 last year to 57.9 mSv this year. The number of workers above the dose limit has reduced from 424 to 3 individuals.
		RENS Average individual Dose NNR ALARA target <5mSv/a	Underground areas: o Special case mines 16.25 mSv/a o Other NNR authorised mines: 5.22 mSv/a All surface areas: 0.7 mSv/a (Number of workers in special case mines underground is 31187 while for other mines it is 49458)	Not Achieved Not Achieved Achieved	The average dose has been reported per category of facility. The method clusters the same type of facilities together. Surface areas have been separated out.
		KNPS Maximum individual dose (50mSv/a)	7.7 mSv/a	Achieved	

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
		Average individual dose NNR ALARA Target <5mSv/a	0.47 mSv/a	Achieved	
	Public risk	Av = 10^{-8}/a Max= 5 x 10^{-6}/a	KNPS – 2 x 10^{-9} [1] 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
	Adequacy of emergency preparedness arrangements around nuclear installations reviewed	Necsa Reporting on emergency preparedness	Reports	Achieved	NNR attended the agreed Necsa emergency exercises.
		Koeberg Monitoring of implementation of corrective actions identified during the February 2004 emergency exercise	Monitoring done and reported.	Achieved	
3. To ensure a holistic compliance assurance approach including safety culture enhancement	Compliance index: Expressed as a percentage of holders compliance to regulatory requirements and derived as a ratio of non-compliance findings vs the number of inspections carried out by the NNR	Holders of Authorisation Compliance Index > 80%	RENS: 68%	Not Achieved	115 inspections were conducted during the financial year. The index has improved from 55% during the previous financial year to 68%. Efforts to bring about further improvements are planned.
			NTWP: 99%	Achieved	
			Koeberg: 86%	Achieved	
4. To review and implement the current legislation (NNRA), update the associated regulatory rules, and continuously monitor SA's legislative environment	Proposals for implementation of legislative updates relevant to the South African environment	Written report on proposed amendments to legislation, issuing regulations and publication of notices	Written reports as appropriate	Achieved	Reports are currently under consideration.

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
5. To issue new conditions of authorisation	Authorisations with new conditions, to address relevant statutory requirements and fundamental safety standards in a holistic manner, issued to all holders.	Issue new conditions of authorization	Plan to develop the new conditions once standards are promulgated.	Not Achieved	This issue depends on the promulgation of safety standards
6. To review safety standards and regulatory practice including regulatory research and development required	Issued document on safety standards and regulatory practice	Updated requirements documents and regulatory guides	Plan developed to review requirements documents and regulatory guides once safety standards are published	Not Achieved	Awaiting Safety Standards publication according to Section 36 of the NNRA
	Research reports	Radon Project research report	Report	Achieved	
		Research reports on iodine prophylaxis	Report	Achieved	
	To prepare NNR fundamental principles and guidelines on the following aspects established	Research reactor core conversion and upgrades	Project not initiated	Not achieved	To be completed in the financial year 2005/6
		Decommissioning	Draft Report	Not Achieved	To be completed in the financial year 2005/6
		Authorization holder compliance index	Draft Report	Not Achieved	To be completed in the financial year 2005/6

B. STAKEHOLDER SATISFACTION

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
7. To ensure effectiveness of all bilateral agreements and other international collaborations	Reports on bilateral meetings and other forums and activities of international collaboration	Reports	Report	Achieved	
8. To improve stakeholder relation management	Communication strategy and plan	Approved communication strategy and plan	Approved documents	Achieved	

	NNR publications (NNR annual report, Tsebo, PAIA report)	Printed publications	NNR publications printed & PAIA report submitted	Achieved	
	Meetings of regional stakeholder consultation forums including interactions with Civil Societies	Reports of the forum meetings	Forum established with civil society reports produced	Achieved	
9. To contribute to social sustainability	Social responsibility policy and plan and reporting	Approved policy	Approved policy	Achieved	The implementation of the policy will be for the next financial year

C. INTERNAL BUSINESS PROCESSES

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
10. To improve business management practices	Procedure/guideline indicating integrated planning, budgeting and control system (ensuring effective internal processes and systems) developed and implemented	Integrated NNR operational plans document	Integrated NNR operational plans document	Achieved	Implementation of the plans currently in progress
	Risk Management Plan developed and implemented	Risk management Plan	Risk management Plan	Achieved	
		Monitoring report	Monitoring report	Achieved	
	Business Continuity Strategy and Plan developed and implemented	Business continuity strategy and plan	Business continuity strategy and plan document	Achieved	
11. To enter into institutional agreements	Cooperative governance agreements with other organs of state concluded and implemented	Conclude cooperative governance agreements by end of financial year	Some agreements concluded while ongoing process to finalise others.	Not Achieved	Cooperative agreement finalised with DOH, while three agreements are being finalised after public comments. The others are at various stages of completion.
12. To facilitate the implementation of the NNR transformation policy and plan	Report on the implementation of the transformation plan	Report on implementation of transformation policy and plan	Report produced	Achieved	Employment Equity; Procurement; Human resource practices alignment to NNR strategic objectives; Internal business processes; Delivery on core business; and stakeholder interaction, reported on.
	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 Tech/Qualified Admin.	75:25 B/W in Top Management 71:29 B/W in Senior Management 61:39 B/W in Professional band 42:58 B/W Tech/Qualified Admin	Achieved	Significant improvements have been made towards achieving employment equity in the organisation.
13. To implement preferential procurement	NNR procurement policy document	Policy consulted and agreed	Procurement Policy approved and implemented	Achieved	
14. To improve the NNR nuclear emergency response	Develop procedures and equip the NNR emergency Control Centre (ECC)	5 procedures, fully equipped ECC	Drafts completed, room partially equipped	Not achieved	Draft procedures in NNR review cycle for approval. ECC in process of being equipped

D. HUMAN RESOURCES

OBJECTIVES	KEY PERFORMANCE INDICATOR	TARGET	ACTUAL	PERFORMANCE RESULTS	NOTES
15. To realign management style, policies and procedures for HR with SA legislation and objectives	Revised NNR management policies, procedures and systems	100% of policies reviewed, consulted and approved	> 90 % policies reviewed	Not achieved	Ongoing consultation with unions resulted in delays in the completion of the deliverable
	Stakeholder satisfaction (Employee satisfaction component)	Report on employee satisfaction survey & develop improvement plans.	Survey conducted and improvement plan produced	Achieved	The employee satisfaction survey was conducted as part of a 100-day turn around strategy.
16. To implement capacity building and development	Organisational capacity A workplace skills plan developed for each year.	Capacity building and development programmes for improving NNR performance	Participation in national nuclear-related education, training and skills development programmes	Not Achieved	While most training was completed according to the skills plan, there has however been loss of skills due to employment terminations. Most critical positions have taken a long time to fill due to shortage of available skills in the market.
	External capacity: Report on NNR participation in University courses and research student supervision.	Report on research student supervision	Report on student supervision	Achieved	
17. Leveraging strategic partnerships and alliances to further the technical expertise of NNR staff	Report on the Participation in the planning & implementation of National program for development of expertise in the industry	Report on participation in STEF	Report on active participation of HR Manager in the Industry Skills Audit and the Policies, Guidelines for participation in STEF CEO: participation in the leadership of STEF	Achieved	
	A plan for leveraging strategic partnerships developed and implemented	A plan for leveraging strategic partnerships developed and implemented	Approved strategy	Achieved	Implementation for next financial year.
18. To integrate the Balanced Score Card Approach in performance management	A plan developed and implemented to integrate the balanced score card within the performance management system	Performance Management Policy aligned to the Balanced Scorecard	The Draft Performance Management Policy developed	Not Achieved	The Draft Performance Management Policy is being consulted in the organisation and will form part of the HR Manual to be reported on June 2005

Balance Sheet at 31 March 2005

	Notes	2005 R	2004 R
Assets			
Non-current assets			
Property and equipment	2	2,104,390	1,952,916
Retirement benefit asset	5	3,478,000	-
Current assets		47,551,669	24,709,513
Trade and other receivables	3	9,733,486	9,502,143
Cash and cash equivalents	12.2	37,818,183	15,207,370
		53,134,059	26,662,429
Equity and liabilities			
Reserves			
Accumulated surplus / (deficit)		4,898,845	(1,485,725)
Non-current liabilities			
Retirement medical benefits	5	25,315,000	22,774,000
Current liabilities		22,920,214	5,374,154
Trade and other payables		2,124,117	2,789,469
Provisions	6	2,796,097	2,584,685
Deferred income - DME Grant		18,000,000	-
		53,134,059	26,662,429

Income Statement for the year ended 31 March 2005

	Notes	2005 R	2004 R
Operating income	7.1	**52,598,040**	48,704,731
Operating expenses		**(47,106,356)**	(46,136,738)
Operating surplus		**5,491,684**	2,567,993
Interest received		**892,886**	786,729
Net surplus for the year		**6,384,570**	3,354,722

Statement of changes in equity for the year ended 31 March 2005

	Accumulated surplus / (deficit)
	R
Balance at 31 March 2003	(4,840,447)
Surplus for the period	3,354,722
Balance at 31 March 2004	**(1,485,725)**
Surplus for the period	**6,384,570**
Balance at 31 March 2005	**4,898,845**

Cash flow statement for the year ended 31 March 2005

	Notes	2005 R	2004 R
Cash flow from operating activities		**23,456,787**	**6,540,858**
Cash receipts from authorisation holders and applicants		52,366,697	46,252,119
Cash paid to suppliers and employees		(29,802,796)	(40,497,990)
Cash generated from operations	12.1	**22,563,901**	**5,754,129**
Interest received		892,886	786,729
Cash flow from investing activities			
Acquisition of equipment		(845,974)	(805,523)
Net increase in cash and cash equivalents		**22,610,813**	**5,735,335**
Cash and cash equivalents at beginning of the period		15,207,370	9,472,035
Cash and cash equivalents at end of the period	12.2	**37,818,183**	**15,207,370**

Notes to the financial statements for the year ended 31 March 2005

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 principal 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 are 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 2005

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 instrument.

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 year.

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 2005

	2005			2004		
	R	R	R	R	R	R
2 Property and equipment						
	Cost	Accumulated Depreciation	Book value	Cost	Accumulated Depreciation	Book value
2.1 Carrying amount as at the beginning of year	**9,711,064**	**(7,758,147)**	**1,952,917**	**8,989,889**	**(6,737,056)**	**2,252,833**
Furniture	687,478	(394,174)	293,304	627,309	(337,262)	290,047
Office equipment	815,937	(511,137)	304,800	673,095	(412,470)	260,625
Computer equipment	4,255,640	(3,748,543)	507,097	4,042,414	(3,269,277)	773,137
Scientific and technical equipment	2,356,767	(2,206,129)	150,638	2,258,622	(2,162,094)	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
2.2 Additions	**845,974**	**-**	**845,974**	**805,522**	**-**	**805,522**
Furniture	69,316	-	69,316	60,169	-	60,169
Office equipment	167,552	-	167,552	142,842	-	142,842
Computer equipment	378,813	-	378,813	297,573	-	297,573
Scientific and technical equipment	137,085	-	137,085	98,145	-	98,145
Computer software	93,208	-	93,208	206,793	-	206,793
Property - Buildings	-	-	-	-	-	-
Property - Land	-	-	-	-	-	-
2.3 Disposals / adjustments	**-**	**-**	**-**	**(84,347)**	**52,646**	**(31,701)**
Furniture	-	-	-	-	-	-
Office equipment	-	-	-	-	-	-
Computer equipment	-	-	-	(84,347)	52,646	(31,701)
Scientific and technical equipment	-	-	-	-	-	-
Computer software	-	-	-	-	-	-
Property - Buildings	-	-	-	-	-	-
Property - Land	-	-	-	-	-	-
2.4 Depreciation	**-**	**(694,501)**	**(694,501)**	**-**	**(1,073,737)**	**(1,073,737)**
Furniture	-	(55,940)	(55,940)	-	(56,912)	(56,912)
Office equipment	-	(117,222)	(117,222)	-	(98,667)	(98,667)
Computer equipment	-	(279,467)	(279,467)	-	(531,912)	(531,912)
Scientific and technical equipment	-	(53,260)	(53,260)	-	(44,035)	(44,035)
Computer software	-	(177,925)	(177,925)	-	(331,846)	(331,846)
Property - Buildings	-	(10,687)	(10,687)	-	(10,365)	(10,365)
Property - Land	-	-	-	-	-	-
2.5 Carrying amount as at the end of year	**10,557,038**	**(8,452,648)**	**2,104,390**	**9,711,064**	**(7,758,147)**	**1,952,917**
Furniture	756,794	(450,114)	306,680	687,478	(394,174)	293,304
Office equipment	983,489	(628,359)	355,130	815,937	(511,137)	304,800
Computer equipment	4,634,453	(4,028,010)	606,443	4,255,640	(3,748,543)	507,097
Scientific and technical equipment	2,493,852	(2,259,389)	234,463	2,356,767	(2,206,129)	150,638
Computer software	1,260,950	(1,012,294)	248,656	1,167,742	(834,369)	333,373
Property - Buildings	213,750	(74,482)	139,268	213,750	(63,795)	149,955
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 2005

	2005 R	2004 R
3 Trade and other receivables		
Trade receivables	**10,718,448**	8,381,504
Less: Provision for doubtful debts	**(1,593,474)**	(902,419)
Net trade receivables	**9,124,974**	7,479,085
Other receivables	**608,512**	2,023,058
	9,733,486	9,502,143

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	
	2005	2004	**2005**	2004
Discount rate at 31 March 2005	**9.00%**	9.00%	**9.00%**	9.00%
Expected return on plan assets at 31 March 2005	**9.20%**	9.20%	**-**	-
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 2005

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	
	2005 R	2004 R	**2005** R	2004 R
Amounts recognised in the balance sheet				
Present value of funded obligations	**36,261,000**	29,626,000	**25,315,000**	22,774,000
Fair value of plan assets	**(42,557,000)**	(33,768,000)	**-**	-
	(6,296,000)	(4,142,000)	**25,315,000**	22,774,000
Unrecognised actuarial loss	**(3,871,000)**	(3,871,000)	**-**	-
Unrecognised post employment benefit asset	**6,689,000**	8,013,000	**-**	-
Net liability in balance sheet	**(3,478,000)**	-	**25,315,000**	22,774,000
Movements in the net liability recognised in the balance sheet are as follows				
Net liability at beginning of the year	**-**	(624,000)	**22,774,000**	20,947,000
Change in accounting estimate	**-**	-	**-**	-
Net liability at beginning of the year	**-**	(624,000)	**22,774,000**	20,947,000
Net expense recognised in the income statement	**1,179,000**	4,838,000	**3,405,371**	2,535,821
Contributions	**(4,657,000)**	(4,214,000)	**(864,371)**	(708,821)
Net liability/(asset) at end of the year	**(3,478,000)**	-	**25,315,000**	22,774,000

6 Provisions

	Leave pay provision R	Bonus provision R	Total R
Opening balance	2,081,800	502,886	2,584,686
Additional provision	237,754	(26,343)	211,411
Utilisation of provisions	-	-	-
Closing balance	2,319,554	476,543	2,796,097

	Notes	2005 R	2004 R
7 Operating surplus			
Operating surplus is stated after taking into account the following:			
7.1 Operating income			
7.1.1 Revenue		**44,531,040**	41,084,828
Authorisation fees		**44,513,183**	41,081,721
Other		**17,857**	3,107
State contributions	**11**	**8,067,000**	7,610,000
7.1.2 Foreign exchange gain		**-**	9,903
Total operating income		**52,598,040**	48,704,731

Notes to the financial statements for the year ended 31 March 2005

	Notes	2005 R	2004 R
7 Operating surplus (continued)			
7.2 Expenditure			
7.2.1 Auditor's remuneration		**301,202**	393,961
Audit fees			
- current year		**301,202**	113,838
- prior year		**-**	276,831
Expenses			
- current year		**-**	1,296
- prior year		**-**	1,996
7.2.2 Depreciation		**694,501**	1,073,737
Office furniture		**55,940**	56,912
Office equipment		**117,222**	98,667
Computer equipment		**279,467**	531,912
Scientific and technical equipment		**53,260**	44,035
Computer software		**177,925**	331,846
Property - buildings		**10,687**	10,365
7.2.3 Fees for services		**2,291,348**	1,501,229
Technical services		**405,850**	602,727
Administration services		**763,386**	503,159
Internal audit and services		**1,122,112**	395,343
7.2.4 Directors' emoluments	9	**555,556**	478,500
Service fee		**555,556**	478,500
Expenses		**-**	-
7.2.5 Staff costs		**30,684,371**	33,327,292
Salaries, allowances and annual payments		**27,004,121**	30,849,584
Included in staff costs are:			
Defined benefit plan expenses		**1,179,000**	7,393,000
- current service cost		**3,440,000**	3,994,000
- interest cost		**2,666,000**	4,343,000
- return on assets		**(3,252,000)**	(2,214,000)
- actuarial gain recognised		**(351,000)**	(6,743,000)
- reversal of prior year un-recognised post-employment benefit asset		**(8,013,000)**	-
- Unrecognised post employment benefit asset		**6,689,000**	8,013,000
Post-retirement medical benefit		**3,405,371**	2,535,821
Post-retirement medical benefit		**3,405,371**	2,535,821
Change in accounting estimate (Being change in past services cost, non-vested benefits)		**-**	-
7.2.6 Loss on scrapping of assets		**-**	31,701
7.2.7 Bursaries		**125,286**	132,768
7.2.8 Operating leases		**1,914,621**	1,549,848
Office building		**1,215,826**	1,110,136
Equipment		**625,667**	366,013
Vehicles		**73,128**	73,699

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 2005

	2005 R	2004 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	**5,498,931**	6,771,183
Expenditure		
(Foreign consultants)	**5,498,931**	6,771,183

9 Directors' and executive staff emoluments

For the year ended 31 March 2005	Salaries/ fees R	Bonuses R	Pension contribu-tions R	Other contribu-tions R	Total R
Non-Executive Directors					
Prof K Bharuth-Ram	83,402	-	-	-	83,402
Mr D Elbrecht	53,918	-	-	-	53,918
Rev P Grove	13,528	-	-	-	13,528
Mr BM Hawksworth	20,831	-	-	-	20,831
Dr T Lesoli	59,978	-	-	-	59,978
Ms TNM Mashanda	65,777	-	-	-	65,777
Ms TN Mgoduso	60,096	-	-	-	60,096
Adv BM Mkhize	86,241	-	-	-	86,241
Mr AHCH Motaung	40,694	-	-	-	40,694
Dr J M Stewart	67,709	-	-	-	67,709
Prof SH Taole	3,382	-	-	-	3,382
	555,556	**-**	**-**	**-**	**555,556**

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

Executive Director					
Ms LB Zondo (CEO)	514,315	-	-	20,822	535,137
	514,315	**-**	**-**	**20,822**	**535,137**
Executive staff					
Ms SR Bogatsu	168,262	-	23,851	27,109	219,222
Mr GA Clapisson	455,530	41,160	72,892	26,653	596,235
Dr ND Kgwadi	340,778	26,301	55,840	52,732	475,651
Mr J Mabaso	444,185	39,549	64,971	47,411	596,116
Mr AE Muller	380,150	77,115	60,093	46,385	563,743
Mr CO Phillips	457,419	21,918	71,944	24,898	576,179
Dr AS Tsela	465,219	70,227	72,892	28,973	637,311
	2,711,543	**276,270**	**422,483**	**254,161**	**3,664,457**

Notes to the financial statements for the year ended 31 March 2005

		2005 R	2004 R
10 Future operating lease commitments			
10.1	Equipment	**631,330**	595,920
	Vehicles	**20,797**	77,040
	Property	**2,400,867**	1,221,144
	Up to 1 year	**3,052,994**	1,894,104
10.2	Equipment	**1,262,660**	1,819,068
	Vehicles	**-**	35,262
	* Property	**4,993,804**	-
	1 to 5 years	**6,256,464**	1,854,330

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

11 Related party transactions

		2005		2004	
Institution	Transaction type	Amount of transaction R	Amount received R	Amount of transaction R	Amount received R
Department of Minerals and Energy	State contributions	**8,067,000**	**8,067,000**	7,610,000	7,610,000

12 Notes to the cash flow statement

	2005 R	2004 R
12.1 Cash generated by operations		
Operating surplus	**5,491,684**	2,552,760
Adjustment for :	**18,659,966**	4,397,610
Depreciation	**694,501**	1,073,737
Net loss on disposal of obsolete assets	**-**	31,701
Foreign exchange gain / loss	**-**	15,233
Increase in provision for leave pay and bonuses	**211,412**	472,871
(Increase)/Decrease in provision for pension retirement benefit	**(3,478,000)**	624,000
Increase in provision for retirement medical benefit	**2,541,000**	1,827,000
Increase in provision for doubtful debts	**691,053**	353,068
Increase in defferred income	**18,000,000**	-
Working capital changes	**(1,587,749)**	(1,196,241)
Increase in accounts receivable	**(922,398)**	(2,805,680)
(Decrease)/Increase in accounts payable	**(665,351)**	1,609,439
	22,563,901	5,754,129

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	**37,818,183**	15,207,370

Notes to the financial statements for the year ended 31 March 2005

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 2005

	Weighted average effective interest rate %
Assets	
Cash	6.63%

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.

	2005 R	2004 R
13.4 Fair value of financial instruments		
At 31 March 2005 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 liabilities of the NNR are stated below:		
Assets		
Cash and cash equivalents	**37,818,183**	15,207,370
Trade and other receivables	**9,733,486**	9,502,143
Liabilities		
Trade and other payables	**2,118,465**	2,789,469

14 Value-added statement

	Notes	2005 R	2004 R
- Revenue		52,598,040	48,704,731
- Paid to suppliers for materials and services		(19,407,734)	(14,213,417)
- Interest earned		892,886	786,729
Total wealth created		34,083,192	35,278,043
- Salaries, wages and other benefits		27,004,121	30,849,584
- Providers of capital		-	-
- Net financing costs		-	-
- Dividends		-	-
- Central and local government		-	-
- Reinvested in the organisation to maintain and develop operations		7,079,071	4,428,459
- Depreciation and recoupments		694,501	1,073,737
- Retained income		6,384,570	3,354,722
Total wealth distribution		34,083,192	35,278,043
Value-added ratios			
- Number of employees		70	75
- Revenue per employee		751,401	649,396
- Wealth created per employee		486,903	470,374



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
DOH – Department of Health
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
LCR – Licence Change Request
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
STEF – Science and Technology Education Fund
TRANSSC – Transport Safety Standards Committee
UK NSD – United Kingdom Nuclear Safety Directorate
WASSC – Waste Safety Standards Committee
mSv – milliSievert
µSv – microSievert
Sv – Sievert

THE MANAGEMENT STRUCTURE OF THE NNR

Executive Committee



Mr Maurice T Magugumela:
CEO



Dr Simanga Alex Tsela
Senior Manager: RSD



Mr Orion Phillips
Senior Manager: NTNS



Mr Guy Clapisson
Senior Manager: PRD



Mr Alan Muller
Acting: Assessment Coordinator

Management Committee



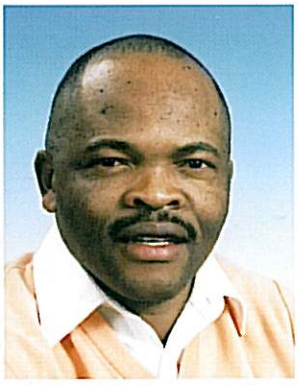
Mr Rodney Elk
Senior Legal Advisor



Mr Thiagan Pather
Manager: NTWP



Mr BP Nkhwashu Manager: Communication & Liaison



Mr Jabu Mabaso
Manager: HR



Mr Zama Zitutu
Manager: RENS



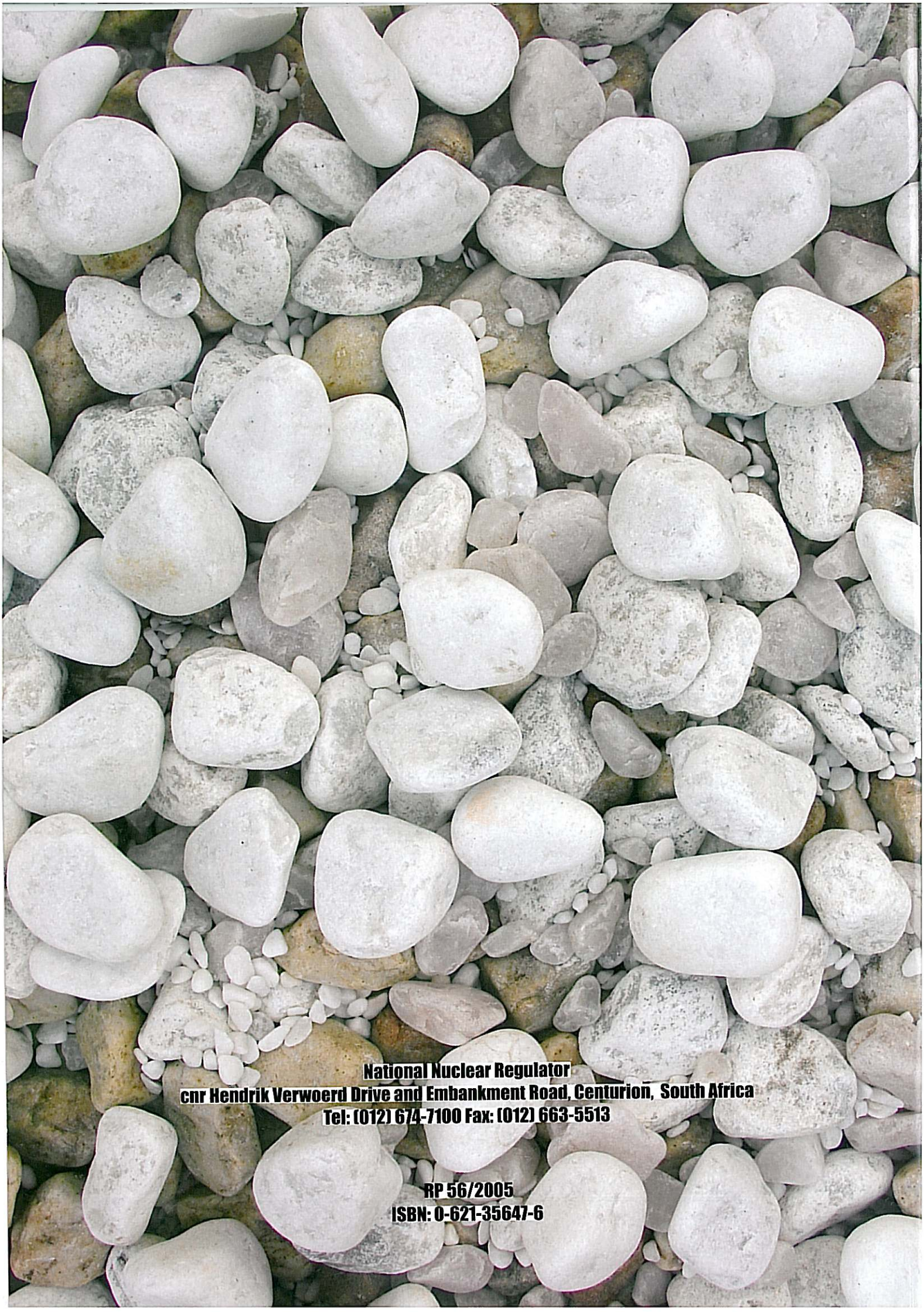
Dr Kasturi Jutle
Manager: RRD



Dr Tim Hill
Manager:
Koeberg Programme



Mr Peter Bester
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