



NECSA – South African Nuclear Energy Corporation

NECSA (formerly the Atomic Energy Corporation of South Africa (AEC)) has operated at its Pelindaba site for more than 35 years in the field of nuclear and related technology. It is committed to the creation of national wealth through the utilization of appropriate technology within the framework of the social and environmental opportunities facing South Africa.

The fundamental organizational reconstruction implemented over the past several years through its 2000 PLUS PLAN, reached a milestone in February 2000 when it was renamed to NECSA (South African Nuclear Energy Corporation), through a revised Nuclear Energy Act. The realignment of the corporation's internationally recognized technological expertise and infrastructure has resulted in two main divisions, Pelindaba Nuclear Institute (PNI) and Pelindaba Technology (PT), geared towards achieving key corporate objectives.

These are:

A) For PNI:

As the national nuclear institution, to perform the following nuclear functions on behalf of the state-

- Nuclear radiation technology
- Nuclear fuel programme
- Nuclear Waste and liabilities management
- Nuclear and conventional risk management
- Pelindaba site management
- Quality and Engineering management
- International nuclear safeguards of nuclear material

B) For PT:

To develop, commercialise and operate a portfolio of profitable business opportunities within NECSA's core competencies of fluorination and radiation technology with the support of the mechanical and systems engineering capability.

Growth in Revenue

External income of sales of mainly nuclear medical and industrial products have increased to R256 million for 1999/2000 which represents a compounded growth rate of more than 20% average per annum over the last ten years. Of this total, 54% occurred for exports to more than 30 foreign countries.

NECSA's commercial division of established businesses has been fully profitable since 1998/99 and has achieved a net profit (after interest) of R13,3 million during the past fiscal year. Its privatisation during the next two to three years is now possible.

Institutional Activities

1. The SAFARI-1 nuclear reactor (20 Mw) has recently been recognised as a national asset by a Government appointed international review team. This facility and its associated radiation technology expertise are operated and maintained to serve the national community, while actively exploiting its isotope production capabilities to partly cover costs through international sales. Currently 67% of its costs are covered through commercial



income from exports whilst the remaining State support is for maintaining access for research by the academic community.

2. NECSA continues to play an active role within the International Atomic Energy Agency (IAEA) and its associated regional agreement, AFRA (African Regional Agreement for Research, Development and Training related to Nuclear Science and Technology) with various projects on a national basis, within African countries. This contributes to the African renaissance.
3. NECSA plays an important technical role in advising Government on nuclear non-proliferation matters.
4. The Pelindaba skills Institute, through its technical training centre provides skills training as part of an outreach to the community at a cost of R3,5 million for 1999/2000. In the past 5 years, more than 400 artisans and 600 technicians, mainly from the disadvantaged communities, were trained and placed in industry.
5. The PBMR project group has contracted NECSA to undertake a feasibility study for the proposed Pebble Bed Modular Reactor (PBMR) with respect to fuel plant design and manufacture of the fuel at Pelindaba.

1. Large-scale radioisotope production now approaches R50 million per annum for local and export consumption in the medical and industrial markets for radiotherapy, diagnostic imaging and radiation source purposes. (NECSA is currently the third largest producer of bulk medical isotopes in the world.)
2. NECSA remains the sole manufacturer of industrial hydrofluoric acid in South Africa and has a sustained share of the export market for this commodity.
3. A 15 cubic meter per hour plant, for the recovery of methane from biogas released from landfills, was successfully installed at Weltevrede in eastern Gauteng. The conversion of municipal trucks to methane fuel (instead of diesel usage) has already generated cost savings of up to R34 000 per truck per annum.
4. The unique patented rock dust analyser "SafeDust" which is expected to play a significant role in preventing coal dust explosions in coal mines. The commercial launch of this product was successfully concluded and the product will now be marketed locally and internationally
5. Over the past three years, four (4) chemical production plants were brought on stream, producing speciality chemicals and generating foreign earning in markets abroad. These include:

Industrialisation of products and services

NECSA has developed a wide range of advanced nuclear-related products and process applications in mining, food, agricultural and chemical industries. The product and service portfolio was rationalized over the past two years to ensure profitability and to focus only on the exploitation of its core technological competencies. This portfolio includes:

- A 600 tpa plant to produce gaseous SF₆ for high voltage insulation applications.
- A plant to produce a high-purity WF₆ gas for application in the semiconductor industry
- A ClF₃ plant which produces high purity gas for chamber cleaning applications in the semiconductor industry.
- A joint venture plant with a foreign chemical corporation to produce



precursor product for the pharmaceutical industry.

- 6. New chemical development projects that are currently in the early stage of industrialization, include:
 - A pilot plant for the production of a range of short chain fluorocarbons used as monomers in the polymer industry or as intermediates in the manufacture of speciality chemicals.
 - A pilot plant for the production of longer chain fluorocarbons used in the engineering sector (eg fire fighting applications).
 - A joint venture facility for further processing the output of the first mentioned pilot plants.
 - A joint venture plant between NECSA, BOC Edwards and the Industrial Development Corp. of SA for the production of NF_3 for the semiconductor industry.

is committed to gain accreditation in the next two years. Several facilities on site, including the SAFARI reactor and the PBMR Fuel Division, are accredited to the SABS ISO 9002 quality standard.

All projects at NECSA are reviewed at the design stage to address HSE matters timeously. The projects are subject to risk assessment, including environmental risk before approval. Several projects have followed the full environmental impact assessment approval process as specified by the national environmental authorities.

The Pelindaba site is fully licensed by the National Nuclear Regulator for nuclear operations and is subject to various other Government (both Central and Provincial) permits for air pollution control, waste disposal, water usage and effluent disposal.

A community forum to promote openness and transparency with the local stakeholders was established more than four years ago and is known as the Pelindaba Communication Forum (PCF) which meets monthly under the leadership of an elected community representative.

The repositioned NECSA is committed to the creation of wealth for all South Africa's people through the effective utilization and application of its technology. NECSA's well developed infrastructure and breadth and depth of advanced skills and competencies have now been redirected towards building a new globally competitive South Africa and playing an active role in the African renaissance.

NECSA's Budget Allocation for 2000

Of the governmental budget allocation for activities of R147 million for 2000/01, at least R122 million (83%) will be channelled to institutional and social investment activities, whilst R25 million (17%) will be allocated to the chemical development portfolio of activities within the commercial division. In the coming financial year of 2001/02 fiscal support for further chemical process development, will cease.

Corporate Health, Safety and Environment (HSE) Policy

NECSA has a well established conventional and radiological safety system. Environmental aspects are integrated within the HSE system. The documented procedures are compatible with the ISO 14001 Environmental Management Standard for which NECSA

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PEBBLE BED MODULAR REACTOR

FACT SHEETS

NUMBER	TITLE
PBMR-FS-2000.07.0001	How does a Pebble Bed Modular Reactor work?
PBMR-FS-2000.07.0002	Utilization of Fuel in a PBMR
PBMR-FS-2000.07.0003	Disposal of spent nuclear fuel
PBMR-FS-2000.07.0004	LLW, ILW and effluents produced by the PBMR (includes waste classification)
PBMR-FS-2000.07.0005	Low Level Radiation: Friend or Foe?
PBMR-FS-2000.07.0006	The environmental balance sheet
PBMR-FS-2000.07.0007	Let's consider our options: the PBMR and Renewables
PBMR-FS-2000.07.0008	Decommissioning Nuclear Installations
PBMR-FS-2000.07.0009	The safety of the PBMR during normal operations
PBMR-FS-2000.07.0010	The safety of the PBMR: what if things go wrong?
PBMR-FS-2000.07.0011	Nuclear accidents: an overview
PBMR-FS-2000.07.0012	Nuclear Weapons and the PBMR
PBMR-FS-2000.07.0013	Costs and Benefits of the PBMR
PBMR-FS-2000.07.0014	NECSA South African Nuclear Energy Corporation