



## KEYNOTE ADDRESS ON 27 OCTOBER 1999

# The Priorities for ANSTO

PROFESSOR HELEN M. GARNETT  
ANSTO, PMB 1, Menai 2234.

As Australia's major centre of expertise in nuclear science, technology and its applications, ANSTO's priorities take account of the stated strategic and tactical needs of its various stakeholders, which in turn are considered as the Government (as owner), industry – including the health sector, the academic and research community and the public at large. Its priorities also take account of the opportunities perceived by its own staff in the light of the organisation's strengths, the activities of the international scientific, technology and industry community and a rapidly changing socioeconomic environment where environmental management and social accountability are becoming as important as fiscal responsibility and accountability.

## 4. INTRODUCTION.

ANSTO's activities range from the provision of products, such as radioisotopes and radiopharmaceuticals, to services, including advice to Government, irradiation services to industry, including the resource, health and agricultural sectors, provision of functional neutron scattering beamlines and instrumentation to researchers from industry, universities and other state and national research institutions, provision of isotopic analyses of biological, archaeological, environmental and industrial samples using its reactor and accelerators to a wide range of national and international clients, industrial training in radiation protection and radiological safety nationally and regionally and research, development and technology transfer, particularly in areas which benefit the environmental sector, the resource and resource processing industries, the manufacturing and the health sector. ANSTO's future capacity to benefit Australia is a function of its facilities, its people and its processes.

## 2. THE FABRIC OF THE ORGANISATION

### 3.1 Facilities.

The core of ANSTO's facilities is a research reactor. The current reactor HIFAR will operate to around the end of 2005. The project to replace this facility by a modern research reactor, a high priority for ANSTO and the scientific and technology community at large, is now well underway. The priorities for this facility are to meet the predicted

- range, quantity and specific activity of radioisotopes both for medical and industrial procedures and for research to understand environmental, biological and industrial processes
- irradiation requirements of samples to enable fission track analysis, as used in petroleum exploration, neutron activation analysis for the resource, environmental and manufacturing industries and for forensic and occupational medicine
- fields of research endeavour where neutron studies will be an essential component of leading edge studies and from which Australia has the potential to benefit.

Further details on the replacement research reactor and its many uses are covered in a separate paper.

Other complementary facilities which are priorities now and for the future are accelerators and accelerator-based instrumentation. These include provision of

- a small modern accelerator to replace the 40 year old van de Graaff which will service the need for ion beam analysis, particularly of surfaces - a growing research field, and provide a routine facility for the burgeoning applications of C-14 dating.
- continued availability of synchrotron radiation for world class X-ray studies to complement other accelerator-based analyses (ion beam etc) as well as to complement neutron studies of industrial materials such as polymers,
- additional cyclotron capability in the longer term to complement the existing production facility, particularly for research and development project.

### 3.1 People

A priority for ANSTO is the availability of versatile committed staff, staff who qualify as knowledge workers. Such knowledge workers will not just create or access knowledge, they will harness information and knowledge to produce useful action which will benefit ANSTO and Australia at large. Knowledge workers respond to and cope with unstructured and, uncertain environments. Further, addressing significant questions and producing useful actions almost invariably requires interdependent teams and the capacity to work across units within the Organisation, with staff from other research organisations, from universities and from industry in interdependent teams – teams established to undertake a particular project, which subsequently dissolve. These requirements mean that priorities for ANSTO are

- recruitment of adequately educated staff, with their own discipline knowledge and professional networks who are prepared to share information and knowledge
- retention and development of staff who are flexible and agile and committed to ongoing learning; staff prepared to spend the time to develop shared understandings with the members of their current team regardless of the culture of those members' parent organisations and staff committed to serving our clients
- reward of staff in a merit based system.

### 3.1 Processes

ANSTO has developed and implemented new processes for capturing ideas, scoping and evaluating possible projects, costing and pricing its products, services and research activities and monitoring progress, outputs and outcomes.

A priority for the Organisation is consistent implementation of these processes and, as appropriate, improvement thereof. A further priority is the development of more effective systems to enable sharing of information and the capturing of relevant data to answer the increasing demands for external reporting against a host of parameters.

## 3. ACTIVITIES

ANSTO's vision is for nuclear science and technology to be valued as benefiting all Australians through the innovative endeavours of ANSTO, one of the world's leading nuclear science and technology organisations. In addressing this vision, five core science 'business'

areas have been identified as the most appropriate for focussing our effort. Within these, the medium term priorities for business development, services and research and development projects have been scoped through stakeholder and client consultation, the activities being chosen for their potential impact.

### 3.1 International Strategic Relevance of Nuclear Science and Technology

The major priorities of this area are to

- apply knowledge by the provision of quality scientific and technical advice on the nuclear fuel cycle, including reactor operations, reactor safety and the safeguarding of nuclear materials
- contribute to IAEA Cooperative Research Programs, particularly those directed to improving fuel storage, reactor safety, management of uranium tailings and management of nuclear waste
- lead projects in the Asia/Pacific region to understand coastal and marine pollution pathways, which require isotope applications
- develop and apply sensitive analytical procedures in support of wide area monitoring for safeguard purposes, that is for independent monitoring of the presence and type of nuclear activities
- develop and test a model to effectively predict the radiological consequences for any incident in tropical and subtropical regions, noting that existing models have been developed for northern hemisphere temperate climates
- develop methods for assessing and improving safety culture at nuclear installations and test these within ANSTO and in the Asian region, the focus being on non-power installations

### 3.1 Core Nuclear Facilities, Operation and Development

The major priorities in this area are to

- operate HIFAR and ANSTO's accelerators, and their associated instrumentation safely and efficiently, so that they are available for the maximum time to produce product and deliver required services for business and research purposes
- develop leading edge instrumentation for these facilities to enable innovative research on materials of a biological, environmental, geological or industrial nature
- provide expertise in the interpretation of data from these various facilities

Associated with this area is the Replacement Research Reactor Project, the objectives of which are discussed elsewhere in this meeting, and the

development of other infrastructure as mentioned above.

### **3.1 Applications of Nuclear Science and Technology to the understanding of Natural Processes**

The objective of this area of endeavour is to apply nuclear-based techniques to research projects in support of national and international programs, such as investigations of global climate change, environmental pathway analysis and to applied studies driven by industry and government. The major priorities over the next few years are to

- quantify and evaluate annual and seasonal variations in fine particle elemental concentrations in air masses at particular locations as a basis for quantifying the major factors in the atmosphere likely to be responsible for present and future climate change
- apply a range of nuclear techniques to studies addressing natural climate variability in the past
- improve the understanding of the biogeochemical processes at solid/liquid interfaces relevant to radionuclide migration in unsaturated soils and aquatic environments focussing on processes that will contribute to solving identified environmental issues or are important for refining the assessment of impact of nuclear facilities, particularly in Australia and the Asia/Pacific, including repositories, uranium mines and sites contaminated with radioactivity

### **3.4 Treatment and Management of Man-Made and Naturally Occurring Radioactive Substances**

The priorities in this core business area are

- development and application of cleaner production techniques for the resources industry-reducing the radioactivity in flue gases, tailings and finished product
- application of specific titanate waste formulations and ANSTO processing technologies for managing radioactive wastes, arising from previous overseas defence programs
- provision of quality assured procedures for handling, characterising and packaging radioactive waste suitable for acceptance by the national repository
- effective management of a program to ship and reprocess HIFAR spent fuel

### **3.5 Competitive and Ecological Sustainability of Industry**

The objective is to develop and apply critical technologies, based on ANSTO's nuclear and associated technical capabilities, which will enhance the competitiveness of selected industry sectors.

In pursuing this objective ANSTO aims to be involved in appropriate CRC's, which are effectively networked with end users. To this end ANSTO has enhanced its participation, the Organisation now being a full member of three CRCs and a potential associate of at least two additional centres. Through these centres its priority activities are

- increasing the reliability and durability of welded structures, such as gas pipelines
- contribution to the cost effective production of improved polymer products that can compete effectively in local and export markets
- commercialisation of a process developed to remove and immobilise metal contaminants from industrial process effluents and groundwater

Other major priorities are

- the provision of quality services, including training - nationally and regionally, based on radiation standards, radiation safety, radiation sterilisation and plant assessment technologies
- strategic research and development in materials science - particularly the engineering of oxide ceramic interfaces by controlled manipulation at the molecular level and understanding the microstructure of selected materials using nuclear science and technology
- strategic and tactical research aimed at reducing the impact of mine waste effluents
- the supply of quality radiopharmaceuticals and radioisotopes for industry and environmental studies, contributing to the international development of new products, particularly those for the management of cancer and movement disorders - problems manifested in Australia's aging population.

## **4. CONCLUSION**

ANSTO, like any effective science and technology Organisation aims to focus and at the same time balance its endeavours. It must continue to develop and enhance its infrastructure, its people and its processes so that it can deliver competitive solutions to current and future problems of those sectors of national and international endeavour where nuclear science and technology can clearly contribute, among which are environment, health, archaeology, resources, process industry and manufacturing. All of these are important to the future of Australia.