A NON-REACTOR FUTURE FOR LUCAS HEIGHTS

Nuclear-Free Campaign – Friends of the Earth, Australia
www.nuclear.foe.org.au
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Summary
* most of the work at ANSTO's Lucas Heights facility, south of Sydney, does not depend on the operation of a research reactor.
* a good case can be made for greater investment in non-reactor technologies/programs at Lucas Heights.
* pursuit of a non-reactor future for ANSTO offers several advantages, including a large reduction in the generation of radioactive waste.

Most of ANSTO's activities do not depend on the reactor:
* Prof. Geoffrey Wilson analysed ANSTO's program expenditure and found that in 1991-92, reactor-dependent research cost $8.35 million (31%), reactor-independent research cost $18.45 million (69%).
* Drawing on ANSTO's 1992-93 Program of Research, former ANSTO scientist Murray Scott concluded that the research reactors (HIFAR and MOATA) reactors were used in 8 of 17 projects. (HIFAR and MOATA have been shut down; ANSTO now operates the 'OPAL' research reactor.)

Advantages of a non-reactor future at Lucas Heights:

A good case could be made for further investment in non-reactor technologies – particle accelerators, possibly spallation technology, safeguards projects using particle accelerators, etc etc. This would open up a win-win scenario:
* few if any job losses (possibly more jobs)
* broadly equivalent (perhaps greater) benefits for medicine and science
* advantages in relation to 'national interest' / non-proliferation objectives
* a large reduction in radioactive waste generation
* less contentious management of existing waste stockpiles in the context of a serious attempt to minimise waste production
* public support for ANSTO instead of division and hostility
* public and occupational health and safety advantages (e.g. there have been no fatal cyclotron accidents, but at least five fatal research reactor accidents).

Research reactors are yesterday's technology:

Over half of all research reactors ever built have been closed and the number in operation continues to decline. Conversely, the number of cyclotrons in operation continues to increase.

Jobs at Lucas Heights:

Staff numbers at Lucas Heights peaked at 1354 in 1976. Staffing fell to about 750-800 despite the operation of the HIFAR research reactor for many decades.

Alternatives to a reactor for medical isotope supply:

Ongoing reliance on existing cyclotrons in Australia, plus a greater reliance on imports, is a perfectly viable alternative to a domestic reactor. This option is tried and tested whenever ASNTO's research reactor is shut down for extended periods for maintenance.

The only problem with greater reliance on imported reactor-produced isotopes is that it leaves other countries to address the waste legacy. Therefore, a R&D program should be initiated to reduce reliance on imports in favour of non-reactor technologies, esp. particle accelerators including cyclotrons. Important in this regard is a paper by nuclear physicist Dr. Robert Budnitz, and energy and technology consultant Dr. Gregory Morris. The report argues that "importation of radioisotopes and more extensive use of accelerators for isotope production represent a viable alternative to the building of a new reactor in Australia."

The Budnitz/Morris report argues that Australia ought to pursue a R&D project into accelerator/cyclotron production of technetium-99m (the most commonly used medical isotope): *"Development of accelerator based production of Tc-99m would probably require a one-to-two year effort involving several person-years of work, and a few million dollars of investment. The pay-off would be that Australia would develop and possess valuable expertise in a nearly radioactive waste and proliferation free route to the production of the world's medically most important radioisotope."*

Serious pursuit of a R&D program along the lines suggested by Budnitz and Morris would probably require investment of a medium-sized research cyclotron, and a good case could be made for locating it at Lucas Heights given the concentration of Australia's nuclear expertise there.

Closure and non-replacement of the Lucas Heights research reactor might also free up resources - and generate political momentum - for the more rapid spread of small PET cyclotrons (costing a few million dollars each) for the production of short-lived isotopes for use in Positron Emission Tomography (the cutting-edge of nuclear medicine). Currently there are several PET cyclotrons in capital cities.

Alternatives to a domestic reactor for scientific research:

ANSTO's contribution to scientific research has been modest, at best. Then federal Shadow Science Minister Martyn Evans said in 1997, "The money should have been competitively offered and judged against other needs for science."

There are several alternatives to a new reactor for scientific research, including particle accelerators, spallation sources, synchrotron radiation sources, and suitcase science (i.e. funding for Australian scientists to access overseas facilities). In all cases, the alternatives are preferable to a reactor in relation to radioactive waste and safety. Claims that synchrotron, accelerator and spallation facilities complement (but cannot replace) reactors understate the extent to which different facilities can be used for identical or similar applications.

'National interest' / foreign policy objectives:

ANSTO is involved in useful environmental sampling safeguards work – but this uses ANSTO's tandem accelerator, not the reactor. No doubt there is scope to increase ANSTO's involvement in safeguards work using accelerators and other non-reactor technologies. And of course non-proliferation and disarmament objectives are fundamentally political/diplomatic in nature (e.g. expanded IAEA inspection rights), not technical.

The Lucas Heights research reactor is of little or no direct value in pursuing non-proliferation objectives. It has been used for a video monitoring safeguards project, but that project could have been carried out elsewhere. Whatever advantages stem from training scientists on a domestic reactor are minimal, can be compensated for by overseas training, and are negated by a range of problems which stem from the operation of a reactor in Australia.

The operation of a reactor compromises Australia's capacity to pursue non-proliferation / disarmament objectives in several ways. For example, it creates a political imperative to downplay the proliferation risks associated with research reactors and associated technologies. Research reactors are used to produce plutonium for the nuclear arsenals of India and Israel, and research reactors have been used in support of covert weapons programs in numerous other countries. The government's argument that building a new reactor will assist with non-proliferation objectives is circular and silly.
There is no direct connection between the operation of a reactor and Australia's place on the Board of Governors of the IAEA. In any case the IAEA position raises numerous problems, not least the active role played by the IAEA in the promotion of dual-use nuclear technologies.

A shift from reactor to non-reactor technologies for medicine, science and safeguards work opens up another potential benefit: Australian promotion of non-reactor technologies in the Asia Pacific region. The development and promotion of non-reactor technologies would represent a useful, if modest, non-proliferation initiative.

More information:

Medical Association for Prevention of War – nuclear medicine: www.mapw.org.au/nuclear-chain/nuclear-medicine

Medical Association for Prevention of War – Lucas Heights: www.mapw.org.au/australian-issues/lucas-heights-reactor

The Friends of the Earth website

www.nuclear.foe.org.au/ansto

has info on

* medical isotope production and supply options

* the foreign policy agenda behind the new reactor at Lucas Heights

* Lucas Heights and nuclear weapons

* a new reactor for 'world class' scientific research?

* ANSTO / ARPANSA whistleblower saga.