

ADDRESSING THE MYTHS

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KEEPING RADIOACTIVE WASTE AT LUCAS HEIGHTS WON'T AFFECT CANCER PATIENTS.

Nuclear Medicine **will continue**, regardless of where nuclear waste is located. A number of clearly false claims have been made in this regard, including by current Minister Pitt on South Australian television.

Most countries do not even make reactor-based nuclear medicines. They import them. We recurrently import nuclear medicines when the reactor breaks down or has a planned outage.

THERE IS PLENTY OF ROOM AT LUCAS HEIGHTS FOR INTERMEDIATE NUCLEAR WASTE.

Dr Carl-Magnus Larsson, the CEO of the federal nuclear regulator, the Australian Radiation and Nuclear Safety Agency (ARPANSA), told a Senate Inquiry in June 2020 that intermediate “*waste can be safely stored at Lucas Heights for **decades** to come.*”

At the same Inquiry he confirmed ARPANSA “*is aware that some stakeholders have interpreted ARPANSA’s decisions regarding the Intermediate Waste Store (IWS) as a requirement for relocation of the waste stored in the IWS, even suggesting that there is an urgent need for relocation. This is not correct. ARPANSA has not raised safety concerns regarding storage of waste at the IWS.*”ⁱ

ANSTO has recently applied to increase storage at Lucas Heights. This is the best place for extended interim storage, with established facilities, staff, expertise and security. It is also safer and cheaper.

TEMPORARY STORAGE IS NOT “WORLD’S BEST PRACTICE”.

Permanent disposal is considered internationally to be the safest **long-term** management option for radioactive waste.ⁱⁱ

Temporarily storing ILW in regional South Australia increases risk, complexity and cost with double handling of waste, building and maintaining a secure additional storage site, and increased long-distance transport of radioactive waste.

It sends the waste to an area that does not have the skill, experience and security present at Lucas Heights.

WORLD’S BEST PRACTICE ALSO REQUIRES GENUINE COMMUNITY CONSENT.

Repeated misinformation, a non-representative ballot (based on town boundaries, not the 50 km radius used in other locations), a complete disregard of native title holders’ unanimous opposition and totally unrealistic job promises are only a few of the problems with the deeply flawed “community consent” process.

THERE ARE MANY REASONS WHY WE HAVE NUCLEAR WASTE.

The role of nuclear medicine production in existing waste has been **grossly overstated**. The government inventory of nuclear waste in Australia from October 2020ⁱⁱⁱ shows:

LOW LEVEL WASTE (4146 m³)

More than half, 2,100 m³, is contaminated soil, 1,970 m³ is ANSTO “operational waste” and the rest includes CSIRO waste, contaminated items, medical equipment and luminous signs.

INTERMEDIATE LEVEL WASTE (535.1 m³)

- 323 m³ is from running the current and previous reactors (HIFAR and OPAL), plus general waste from radiopharmaceutical production
- 165 m³ is uranium and thorium residues stored at ANSTO
- 21 m³ is liquid waste from production at ANSTO of Mo-99 for radiopharmaceuticals
- 6.6 m³ is ILW returned from overseas following reprocessing, currently stored at ANSTO
- 19.5 m³ is miscellaneous waste held at various storage sites in Australia including CSIRO sites. This small volume could be moved to ANSTO to consolidate intermediate waste at one site.

There is also 338 kg of reactor spent fuel at ANSTO, and 522 kg overseas being reprocessed.

Reactor waste currently comes from medical and industrial applications, materials science research, mineral sample analysis and irradiation of silicon for semiconductor manufacture.^{iv}

THERE WILL ALWAYS BE MANY LOCATIONS FOR NUCLEAR WASTE.

As long as patients receive nuclear medicine procedures, hospitals will store medical waste. After nuclear medicine is used in a patient it is stored at hospitals for a few days to weeks. It rapidly loses so much radioactivity the waste then goes to a normal rubbish tip.

There is a very small volume of historical legacy medical waste - mostly old radium that has been safely stored since the 70's. If there are concerns, this could be shipped to Lucas Heights easily enough as it is a tiny quantity. It is miniscule compared to what is at Lucas Heights now, and the massive amount they plan to make in the future.

WE NEED TO STOP THE CURRENT EXPANSION OF WASTE PRODUCTION.

The first principle of managing toxic waste is to **reduce production**.

Currently ANSTO is rapidly expanding its production of nuclear medicine to supply isotope precursors for Tc^{99m}, which is the most commonly used isotope in nuclear medicine.

This massive expansion will hugely increase future intermediate level waste production.

Intermediate level waste remains radioactive for **10,000 years**. This is a very long time - for reference the pharaohs were around 5,000 years ago.

This export business continues because it is heavily subsidised. It has no cost benefit analysis and no full cost recovery.^v

Historically the OPAL reactor at Lucas Heights has produced 1% of the world's supply of Tc^{99m} precursors, which is enough for Australian nuclear medicine practice.

ANSTO is currently increasing this by 25-30 times (i.e. 25-30% of global supply) with very little consultation about the massively increased quantity of ILW this will generate.

ANSTO has proved an **unreliable** supplier, with multiple outages and supply shortages in the last few years.^{vi} When sourcing from a single nuclear reactor, one break in the chain of production shuts down the whole process.

THERE ARE MORE RELIABLE, CHEAPER AND CLEANER WAYS TO MAKE NUCLEAR MEDICINE.

Clean cyclotron production of Tc^{99m} has recently been approved and is being implemented in Canada. This should rapidly become the future of isotope production. It avoids the high cost, serious accident and terrorist risks of nuclear reactors, has no weapons proliferation potential, and creates very little nuclear waste.^{vii} It can utilise pre-existing cyclotrons.

If Tc^{99m} were instead sourced from multiple cyclotrons based in hospitals around Australia, if one broke down there would be supplies available from other cyclotrons. Cyclotrons would provide a much more reliable supply than the current dependence on a single nuclear reactor that has proven unreliable.

Japan, the USA, the UK and several European countries are all looking into implementing the more reliable, safer, cheaper and much cleaner cyclotron production of Tc^{99m}.^{viii,ix,x}

Australia needs to develop and implement cyclotron manufacture, rather than continue to heavily subsidise the current hazardous and costly production method that produces so much ILW.

WE NEED MUCH BETTER (AND MORE RESPONSIBLE) PLANNING.

We do not need a temporary storage facility at Napandee, or anywhere other than Lucas Heights. It is a deeply flawed

proposal on many levels and a waste of money.

We need

- an **open and independent** review of nuclear waste production and disposal in Australia, and
- to shift to **cyclotron** rather than reactor-based production of isotopes for nuclear medicine, as rapidly as feasible.

REFERENCES

ⁱhttps://www.aph.gov.au/Parliamentary_Business/Hansard/Hansard_Display?bid=committees/commsen/3ae991cf-74a3-4f9e-9f5c-fbc6fcecbdf2/&sid=0000

ⁱⁱ <https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/radioactive-waste-safety>

ⁱⁱⁱ <https://www.arpansa.gov.au/about-us/what-we-do/international-collaboration/joint-convention/previous-reports>

^{iv} <https://www.ansto.gov.au/research/facilities/opal-multi-purpose-reactor>

^v Expert Review Panel on Medical Isotope Production <http://cins.ca/docs/panrep-rapexp-eng.pdf>

^{vi} <https://www.theleader.com.au/story/5716557/lucas-heights-nuclear-medical-facility-needs-210m-revamp-report/>

^{vii} <https://news.ubc.ca/2020/12/18/made-in-canada-method-of-producing-life-saving-radioisotopes-receives-health-canada-approval/>

^{viii} https://www.nmp.co.jp/sites/default/files/public/en/press_release/Press%20Release_191011Molybdenum-99.pdf

^{ix} <https://www.annualreviews.org/doi/full/10.1146/annur-ev-nucl-032020-021829>

^x <https://researchbriefings.files.parliament.uk/documents/POST-PN-0558/POST-PN-0558.pdf>