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Parliament of Victoria
Environment and Planning Parliamentary Committee
Inquiry into Nuclear Prohibition
Parliament House, Spring St
EAST MELBOURNE
VIC 3002

28th of February 2020

Re: Inquiry into Nuclear Prohibition

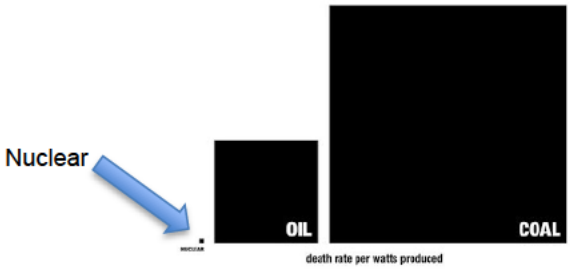
Dear Committee,

This submission is made on behalf of Telix Pharmaceuticals Limited (ASX: TLX), with informal consultation with several of our supply chain partners in Australia and abroad. We are a Melbourne-based clinical-stage biopharmaceutical company specialising in the field of nuclear medicine.

The primary objective of this communication is to convey our view that the debate around nuclear prohibition in Victoria (and Australia) needs to encompass a far wider set of considerations than merely the provision of energy. Australia's energy infrastructure (and mix) may be mostly dated and does not meet the environmental standard of an economy that commands an ecological price-premium for products and services. However, the public discourse around the adoption of nuclear energy *must* reflect the fact that nuclear technology and infrastructure, if planned and implemented correctly, has a societal and economic impact far beyond the commodity of energy.

Our organisation's expertise will contribute little to the fundamental debate around the optimal energy mix, our changing energy needs as a function of future population growth, or the viability of a purely renewables-based objective for Australia's future energy needs. However, we do have extensive expertise in the field of radiation biology and radiation safety. As we publicly discuss the use of nuclear energy, it must be clearly communicated and understood that nuclear technology, in all its peacetime industrial forms, can be safe, effective and controllable. Moreover, the necessary domestic expertise exists in both the public and private sector to protect the health of Australians and our environment, should we choose to adopt a nuclear energy future.

There is extensive misinformation propagated around the safety of nuclear technology compared to other energy production methods, as well as the general industrial safety of nuclear technologies. From a purely industrial and occupational safety vantage, fossil fuel-based energy production is thousands of times less safe than nuclear, across the entire production and waste management (fuel) cycle.



"Death rate per watts produced"

For every person killed by nuclear power generation, 4,000 die due to coal, adjusted for the same amount of power produced.

Figure 1 : "The Triumph of Coal Marketing."[1]

It is unfortunate that the media has decided to sensationalise and propagate further misinformation about Australia's track record in nuclear safety, particularly with recent events such as incident the AIM ^{99}Mo processing centre at the Lucas Heights campus.[2] However, the good news for Australian public

[1] Seth Godin https://seths.blog/2011/03/the-triumph-of-coal-marketing/. Graphic based on compiled data from International Energy Agency (2010) data, inclusive of estimated Chernobyl deaths
[2] AIM incident : https://www.arpansa.gov.au/news/ceo-arpansa-restricts-production-ansto-nuclear-medicine-facility-after-accident

health and safety is that ARPANSA[3], our nuclear safety agency, is immensely experienced with the full spectrum of nuclear safety and radiation protection issues and would be a capable, conservative and independent regulator of nuclear energy scale-up activity, should we chose to adopt a nuclear energy future.

However, the exciting part of an Australian nuclear future is the social and economic benefit far beyond cheaper and more reliable energy supply (and the prospect of a "de-carbonised" future considering the plausible threat of climate change). A robust and well-planned nuclear infrastructure has the following additional benefits:

- Stable and scalable energy supply has a major impact on the efficiency and long-term viability of other key infrastructure needs, such as a water desalination and waste management. Australia's future industrial needs are not currently met in this respect, particularly in states like Victoria, which will experience rapid population growth and further urbanisation over the next three decades.

- Nuclear energy, if correctly designed and implemented, can drive an entire advanced technology ecosystem of corporate activity, job creation and economic development through export of technology, products and services. Victoria – and Australia – needs to be having a serious discussion about how a nuclear economy could build the technology, innovation and advanced manufacturing jobs of the future.

- Australia has tremendous nuclear technology and nuclear medicine expertise in both the private and public sector, including the Australian Nuclear Science and Technology Organisation (ANSTO). ANSTO's investment in medical isotope production is intended to meet 25% of the global needs of key medical isotopes.[4] Future nuclear energy needs could be symbiotically planned with a number of allied industries in mind, such as medicine, advanced materials / semiconductors and other important industrial applications of nuclear technology, fully integrated alongside nuclear power generation. ANSTO has somewhat demonstrated this objective with the OPAL reactor[5], but a stronger benchmark (in terms of a comparable economy) for this activity is probably the CANDU reactor program.[6] A relevant recent example is a partnership with Canada's Bruce Power, which will create a multi-$Bn revenue stream in cancer care, with global impact.[7]

- A nuclear energy program would boost almost every field of endeavour of Australian science, technology, engineering and medicine. Although our universities and research institutions already integrate well with global R&D efforts, a major new industrial sector would have an immensely positive impact on industry-academic engagement, leveraging strength in Australian physics, chemistry and biology as well as create both new graduate employment and re-skilling / re-deployment opportunities for skilled workers in a myriad of infrastructure applications. This is nicely illustrated in an AECL diagram based on CANDU experience (Figure 2).[8]

Australia has the largest uranium reserves in the world.[9] Against a global backdrop of energy demand and economic growth, this means Australia has a resource of global importance. Australia is clearly willing to export uranium to other countries, for the benefit of the Australian economy and its people.[10] Yet, in a fashion not atypical of our country, our uranium exports represent negligible "added-value" and minimal value *capture* for our economy. Instead of building a new wave of economic growth on the back

[3] ARPANSA : https://www.arpansa.gov.au/
[4] ANSTO Nuclear Medicine : https://www.ansto.gov.au/news/nuclear-medicine-facility
[5] OPAL Reactor overview : https://www.ansto.gov.au/research/facilities/opal-multi-purpose-reactor
[6] CANDU history : https://www.ieee.ca/millennium/candu/candu_achievement.html
[7] Bruce Power / ITM announcement : https://www.businesswire.com/news/home/20191113005401/en/Bruce-Power-ITM-Partners-Finalize-Agreement-Paving
[8] As above 6.
[9] Australia's Uranium Profile: https://www.world-nuclear.org/information-library/country-profiles/countries-a-f/australia.aspx
[10] DFAT statistics on Australian Uranium Exports: https://dfat.gov.au/about-us/publications/corporate/annual-reports/asno-annual-report-2018-19/html/section-2/australias-uranium-production-and-exports.html

of the 252 TWh of energy that our Uranium exports produced, in 2019 the value of our uranium exports did not even contribute $1Bn the Australian economy.

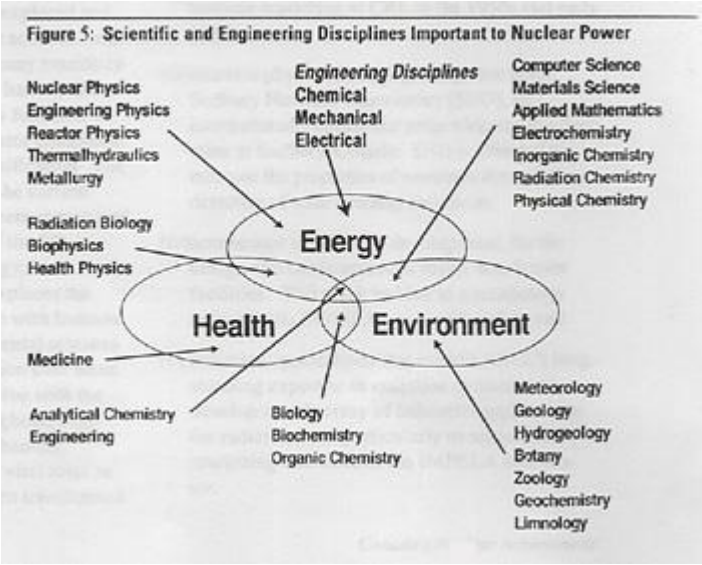


Figure 2: Super-charging STEMM with Nuclear Power. Source: AECL

Australia should embrace a nuclear future, but not just a nuclear *energy* future – rather a comprehensive nuclear technology strategy, including adding value to our 'raw material' nuclear exports. If we take multi-purpose view of nuclear resources, from environmental policy, to industrial diversification and even the possibility of Australia playing a more dominant role global nuclear security (by virtue of our uranium reserves), we can make an investment in our future that will have a positive long-term impact to our society and economy, far beyond the immediate need of cheaper, more stable and ideally carbon-free energy.

It is our submission that Victoria, with its knowledge-based economy and inter-disciplinary technology strengths, should be the focal point of Australia's future nuclear industrial complex. Certainly, in the field of medicine, Telix is already doing our bit to make it happen, but there is much more that could be done to deliver the impact of Australian innovation and nuclear science capability for the benefit of Australians and the Planet.

Sincerely,

[redacted]

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