

Kimba Questions for ANSTO – 6 August 2018

Has ANSTO provided any modelling on just a low level facility?

At the request of the Department of Industry, Innovation and Science (DIIS), ANSTO has modelled the development of a co-located LLW disposal and ILW storage facility. There has not been a request for modelling on a standalone LLW facility.

Do you accept that ANSTO are the main waste producers and that it is a requirement as world's best practice and licensing to find a final disposal site for all Australian legacy and foreseeable radioactive waste?

ANSTO manages about 45% of the low level radioactive waste in Australia. ANSTO notes that there are approximately 100 locations across Australia, including hospitals, industrial sites, and other entities, which also manage radioactive wastes. At the same time, there is no doubt that going forward ANSTO will, largely as a by-product of its production of nuclear medicine, produce the majority of Australia's radioactive waste.

Identifying international best practice in the siting of radioactive waste management facilities is not as simple as identifying international best practice for other nuclear fuel cycle activities. The differing forms of governance globally, in particular, the extent to which community members are involved or engaged in decision-making processes, means that there is not a one-size-fits-all guidance document issued by the International Atomic Energy Agency. However, the requirement for a volunteered site and the ongoing focus on community consultation and consent are at the forefront of international best practice.

ANSTO notes that near-surface disposal facilities—similar to that proposed for the NRWMF—have been developed in many countries, including the United Kingdom, Spain, France, Sweden, Finland, the Republic of Korea, Japan, and the United States—with varying degrees of community involvement. ANSTO also notes that it is standard practice overseas for site selection and development processes for facilities for the disposal of different classes of radioactive waste to proceed on separate timelines, and for the development of low-level waste disposal facilities to precede the development of disposal facilities for other classes of waste.

What are the contingency plans on the return of the TN-81 cask from the UK if a NRWMF is not built?

ANSTO initiated the development of an interim waste store (IWS) facility to temporarily store the first TN-81 cask that was returned from France. In the application that was submitted to ARPANSA, a contingency plan was included to address potential delays in the availability of the NRWMF. It is now likely that the TN-81 cask from the UK will be returned to Australia before the NRWMF is available for its storage. In that case, an application would be made to ARPANSA to vary the licence conditions for the IWS to allow for the temporary storage of the UK waste.

The future inventory of ILW is reported at 1920m³. As ANSTO is increasing its production to capture overseas markets in radio-pharmaceuticals, how much of the extra productions in a % is for export and how much of it will be used within Australia?

Molybdenum-99 is a key isotope that is used as a precursor to nuclear diagnostic medicine. ANSTO produces about 16% of the world's supply of Molybdenum-99, and 2-3% of this production is for local use within Australia and New Zealand. The rest is exported in bulk to the rest of the world.

ANSTO is involved in international exports, as was the intention when the OPAL reactor was created. Molybdenum-99 is a vital resource globally and Australia plays an integral role in ensuring its availability worldwide.

International export allows all costs of processing and waste storage to be offset by sale of nuclear medicine. Similarly, imported nuclear medicines have their waste costs absorbed by the exporting country. Internationally there is an expectation that each country will safely manage the waste that they produce.

The bottom line is because we have benefited from importing nuclear medicine, we have benefited from the responsibility of other countries in managing their own waste, and we will continue to do the same within Australia.

What plans do ANSTO have for the Opal Reactor regarding its potential decommissioning in 30-40 years' time?

When ANSTO submitted the licence applications to construct and operate the OPAL reactor, a high-level decommissioning plan was part of the submission – see <https://www.arpsa.gov.au/sites/g/files/net3086/f/legacy/pubs/regulatory/opal/op/SAR/ch19.pdf>. This gave the regulator confidence that the reactor could be decommissioned safely and that the waste could be managed efficiently at the end of the Facility life. The modern design of the OPAL reactor incorporates lessons from previous reactor designs to aid dismantling and to reduce the waste volumes which will arise from its decommissioning.

The final plans and waste volumes will be determined closer to the end of OPAL's operating life and will be based on the operating experience of the reactor. The decommissioning of a research reactor does not result in a significant quantity of waste; for example, the characterisation of the HIFAR reactor indicates that there will be around 50m³ of ILW generated from its future dismantling.

Question to ANSTO - I understand that there is a current nomination under consideration which is proposing to have a solution for the disposal for the ILW, if a deep burial solution is found sooner than expected how many of the 45 jobs would remain for the National Low Level Waste Facility?

The process to identify a site for a disposal facility for ILW has not commenced, and ANSTO has not undertaken any modelling regarding facility design or resource needs. It is too early to comment on what the future staffing profile of the NRWMF might look like when an ILW disposal solution becomes available.

ANSTO has the licence and the room to store intermediate waste, so that means it can stay at Lucas Heights until a new permanent intermediate storage facility can be found, correct?

ANSTO has a licence to store ILW associated with its activities on an interim basis. The current store is predicted to reach capacity within the next 10 years, so it is not correct to say that we have capacity to store material until an intermediate level waste disposal facility can be developed. Separately, ANSTO has capacity to store returned reprocessed residues from France; however, the licence for the dedicated interim waste store is currently limited to the single TN-81 cask that was received in December 2015.

It is important to note that the ILW store at the NRWFM would not just be for ANSTO's ILW, but also would receive ILW from other Commonwealth agencies, states and territories, and the private sector. This will provide safe and secure storage in a single facility and will allow consolidation to support future ILW disposal planning.

Recently, intermediate level waste was returned to ANSTO from France. Is this waste currently secure and have there been any problems regarding the logistics of transporting and storing said waste on site at Lucas Heights?

The reprocessed residues received from France are stored in a dual purpose transport and storage TN-81 cask. The shipment logistics for this first of a kind operation were complex, but good planning and great co-operation between all the parties ensured that the transport and current storage of the material was achieved without any problems. The waste is currently secure.

ANSTO is widely acclaimed as housing Australia's leading knowledge on the use and handling of radioactivity, how is the Kimba facility, being 2000km away, going to be represented by skilled technicians in the event of an accident should it get the go ahead?

ANSTO's Waste Management Services team comprises suitably qualified and experienced personnel, supported by a range of ancillary services. Team members have been trained and developed at ANSTO to international best practice standards. The operating entity for the NRWFM will be developed in the same way to the same level of skills and experience. The Facility design will have to satisfy the regulator that it is able to operate effectively under all design basis events, and the operating entity will have to satisfy the regulator that it meets all the licence conditions under all conceivable conditions. ANSTO anticipates working closely with the operator of the Facility throughout its lifetime in order to ensure that that operator is able to benefit from our experience. That would include provision of training, staff exchanges, and so forth.

Is there a historic (1980's) agreement between Sutherland Shire and ANSTO and the Federal government to have the Radioactive Waste removed from Lucas Heights?

ANSTO was developed in the 1950s as a science and technology site. During this period, waste was considered by people in the Sutherland Shire. The general consensus was that the Lucas Heights site will be a science and technology site for the decades to come, and it should therefore be managed from this perspective. Waste would only be stored in the short term until it can be moved to a dedicated site.

In the ANSTO Act it specifically states that ANSTO cannot be used as a waste site. ANSTO is a science and technology site which needs to be managed accordingly, with short term storage of waste followed by disposal at a dedicated waste facility. Storing or disposing of waste for extended periods of time at ANSTO would go against the legislation.

ANSTO responsibly manages the waste that it currently has, both low level and intermediate level, through specialist areas and staff. Rigorous licencing and regulation undertaken by ARPANSA ensure the waste is stored safely. However, the ARPANSA licencing is given on an interim basis, with an understanding that waste will be disposed of elsewhere. Licencing of waste at ANSTO for an extended period of time is not possible. The expectation is that LLW will be transported to a permanent disposal facility, and ILW will be transported to a storage facility until a permanent site can be found.

With the recent breakdown at ANSTO of the production of medical products, how did this affect the supply to Australians relying on these products? (Answered by Geoff Currie)

Geoff Currie: There are a large number of patients that rely on the products that come out of ANSTO. The current delay in Australia's production of medical products has provided a clear view of the difficulties that come from importing nuclear medicine products that could otherwise be produced locally. Delayed, cancelled, and rescheduled flights have created significant disruption to patient treatment.

Australia has not felt effects like this in recent times due to the local supply coming out of ANSTO. Production is now back on track and ANSTO has worked hard to achieve this. It has been made clear to the medical industry in Australia how hard it will be to treat patients without ANSTO.

Relying on importing generators (even though they are ANSTO produced 99Mo because it was not a reactor breakdown, it was a processing failure) over the 8 weeks has seen lower amounts of activity delivered and some unreliable timelines. So early on we saw many patients facing disrupted and cancelled procedures. For some, this saw delays in surgery or other treatments. In other sites, delays in diagnosis of bone or heart disease have occurred due to restrictions on the number of patients that can be scanned. In rural and regional Australia the effects have been greatest with patients often travelling a number of hours for procedures that have ultimately not occurred. Many days during the 8 week period have been urgent only bookings.

Currently 4976m³ of LLW is stored at ANSTO. When this LLW is reclassified, how much is estimated to remain, as it has been suggested by ANSTO that 80% of current waste will probably end up in the general waste landfill? How many years after this reclassification will it take to fill the currently licensed facility to capacity?

The current LLW holdings at ANSTO comprise all materials that have been classified as LLW. This holding does not include the material that is released from ANSTO following rigorous characterisation to demonstrate that it is no longer LLW. Whilst it is likely that some of those holdings will decay below regulatory thresholds over the period between now and the time when the NRWMF is operational, it is very unlikely to be 80%—we are not sure where that number came from.

Modelling of how long it will take to transfer current LLW holdings to the NRWMF is still underway.

How long is the ILW likely to be temporarily stored at the national facility?

DIIS estimates that the material would stay at the NRWMF for between 30 to 50 years. This timeframe is required to ensure sufficient time to undertake the comprehensive process required for the site selection and construction of the ILW geological disposal facility - a process that ANSTO also notes would involve extensive community engagement in line with international best practice. This estimate is based on engagement with the International Atomic Energy Agency and various overseas radioactive waste management organisations, which suggests that these timescales are achievable given the maturity of current disposal options.

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LLW & ILW at Lucas Heights. There are a huge number of drums of LLW stored at Lucas Heights. If all the LLW drums were moved out to a permanent storage centre a huge amount of space would become available at Lucas Heights. Space would not be an issue at Lucas Heights and nuclear waste would not need to be brought to Hawker and the Flinders Ranges. Why not use that new space to store the ILW at Lucas Heights where all the security, world class scientists and extremely well trained staff are already located?

ANSTO currently stores around 7,500 x 200L drums of LLW, to be disposed of in a conditioned form at the NRWMF. The main difference between LLW and ILW is the level of radiation. LLW has sufficiently low radiation to allow safe handling and storage without additional shielding. ILW requires additional shielding, which may be in the form of the package (e.g. the TN-81 cask) or in the design of the facilities in which it is stored (the NRWMF ILW storage facilities will include engineered shielding). ANSTO's current LLW storage facility does not have any engineered shielding and therefore would not be suitable for the interim storage of ILW.

Is there the possibility of doing research at the Facility, and having the Facility be in part a research facility?

ANSTO believes that there would be interest in having scientific tourism with possible conferences and related events at the Facility.

ANSTO undertakes a wide range of environmental research, for example, in sustainable water sources and agriculture research, and many of the techniques used would be similar to those that will be undertaken at the NRWMF to provide, through monitoring, assurance of best practice environmental management. The possibility of undertaking value-adding research through the development of the Facility is exciting.

If ARPANSA were to conclude that it is 'world's best practice' to move the intermediate waste twice and grant a storage licence for the Facility, how many of the 45 jobs will remain once a Disposal Site for the intermediate level waste is found?

ARPANSA will consider whether the licence application demonstrates a net benefit from the co-location of LLW and ILW from a range of Commonwealth and potentially state waste owners. It is too early to comment on what the future staffing profile of the NRWMF might look like when an ILW disposal solution becomes available.

The operation of the NRWMF as a co-located LLW disposal and ILW storage facility will allow the operators to become highly experienced in the handling of both types of materials. It is also likely that the NRWMF staff will play a significant role in the development of future ILW disposal solutions, for example, potentially in advisory roles.

Question from both communities:

To DIIS and ANSTO, can you please outline the benefits to the agricultural community that might arise out of the Facility in terms of agricultural research and any other areas?

Nuclear scientific, industrial, and technological research can result in considerable benefits for agricultural research and agricultural applications. Every year, many researchers and scientists from agricultural organisations and universities use technologies developed and available at ANSTO for various research purposes, including:

- assessment of the sustainability of groundwater extraction
- analysing soil cores
- monitoring of the environment and pollution
- analysing new machinery for wear and fatigue
- analysing new farm chemicals
- quantifying soil erosion
- irradiating seeds to produce new characteristics for disease resistance, different food qualities, and agronomic traits to improve the productivity and marketability of grain crops.

Why wouldn't the NRWMF be an important part of a "comprehensive service provider for taking used nuclear fuel? This is the opportunity for South Australia" – Ben Heard, 12th International Uranium Conference 2017.

Adi Paterson: The scope of the Facility is developed under the NRWM Act. This was drafted and passed as a Commonwealth Act, and was eventually amended to be a National Act. This allows waste from states and territories to be disposed of alongside Commonwealth waste.

The scope of the Act does not envisage in any way the importation of waste from overseas, and does not relate to the ongoing discussions about whether this would be an economic opportunity for Australia.

Additionally, the NRWMF is being designed for the disposal and interim storage of Australia's modest volumes of LLW and ILW respectively. The NRWMF, therefore, would not be suitable in terms of both design and size for the storage of international spent nuclear fuel.

Bruce Wilson: There is no prospect that international waste will be stored at this facility, and it will not be licensed for this purpose.

Carl-Magnus Larsson: The licence application for the Facility will describe and outline the waste holdings that are, and will be, destined for the Facility in the future. The source and activities from the activities that will produce this waste will be outlined, and this will prevent waste being taken from overseas.

Why can't the waste be stored at Lucas Heights?

Adi Paterson: ANSTO's Lucas Heights campus is only licensed by the independent nuclear regulator, ARPANSA, to store waste on a temporary basis, and on the condition that a plan is developed by the end of the decade for a final disposal pathway for its waste. Also, multiple commitments have been given to the community around Lucas Heights over many years that the waste could only be stored at Lucas Heights on an interim basis until a purpose-built facility was available. Importantly, ANSTO is a science and research organisation, not a waste management organisation.

Bruce Wilson: This is more than just considering what to do with waste at ANSTO. The project will be taking waste not just from ANSTO but from a number of sources. Waste at places like Woomera has to relocate, and so it makes sense to bring all ILW holdings to a new purpose built, central state-of-the-art facility.

Dr Carl-Magnus Larsson: ARPANSA maintains what it has expressed in the past, that is we consider the waste currently stored at ANSTO to be managed in an appropriate and safe manner, and that ANSTO currently holds a licence to do so, however there has to be an end to this given the legislation says that the waste cannot be disposed of at ANSTO.

Why contaminate a new area? Why don't we leave the waste at Lucas Heights, or Maralinga, or Radium Hill?

The NRWMF will not result in the contamination of any land. Each location needs to be considered on its own merits. Some are contaminated areas, and some are storage areas. Lucas Heights is not a contaminated site; it is carefully managed and safe. The Little Forest is a legacy site and is licensed by the regulator, and is managed under the licence safely.

LLW has well understood characteristics and when over-packed in cemented containers, there is negligible radiation detectable outside of the packaging. We know how to move these safely to a final disposal location, and a safely managed waste disposal site will not become a contaminated area. Finding a reliable site to store LLW is something that needs to happen on behalf of Australia.

Lucas Heights has nearly reached capacity for waste. Removing the waste from Lucas Heights will provide more room for ANSTO to expand its nuclear medicine capability, which will benefit Australia. ANSTO's main function is to provide research and services, not waste management.

Current ILW is composed of TN-81 casks, with 4 to 5 casks anticipated to be stored in Australia in the next 40 years. Additional intermediate level waste will be produced from nuclear medicine production. ILW would be subject to a separate process to the LLW.

The Government's intention is to co-locate waste, which is the standard in many other small countries such as Australia, and comes with a range of benefits. Co-location leads to more jobs, concentrated expertise, and the potential for tourism.

Radium Hill was originally a processing facility that has a lot of contaminated soil. It is not suitable as a disposal site.

Low level waste is not suitable for disposal at Lucas Heights. Lucas Heights is a science and technology campus, not a waste disposal site. ARPANSA licensing of Lucas Heights does not extend to waste disposal.