

INTERMEDIATE LEVEL WASTE CAPACITY INCREASE FACILITY

SITING LICENCE ENVIRONMENT PROTECTION PLAN

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1 INTRODUCTION

Based on current projections of remote handled solid waste (RHSW) production at the ANSTO Lucas Heights campus, existing storage facilities will reach full capacity from 2027 for certain waste streams. Therefore, an additional facility is required to ensure that ANSTO is able to safely store and manage all RHSW produced from the site until the National Radioactive Waste Management Facility (NRWMF) becomes available.

The proposed Intermediate Level Waste Capacity Increase (ILWCI) facility will be located in the Waste Management Precinct of the ANSTO Lucas Heights campus. The facility will be used solely for the purpose of storing RHSW generated from various facilities on site. Any pre-processing or waste conditioning of RHSW will be performed at other existing facilities prior to its transport to the ILWCI facility. The facility will be very similar in design, management and operation to the existing RHSW store (Building 27), which is currently operated by Waste Management Services (WMS) at ANSTO's Lucas Heights campus.

2 PURPOSE AND SCOPE

The purpose of this Environment Protection Plan is to outline the environmental arrangements that are in place within ANSTO which will operate during the siting of the proposed ILWCI facility.

The scope of this plan covers the environmental issues in accordance with the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Act [1] and Legislation [2] and the ANSTO safety arrangements. It specifically covers the issues referred to in the ARPANSA regulatory guidelines for plans and arrangements [3]. This plan should be read in conjunction with the other plans and supporting documents comprising the siting licence application, specifically the: Safety Management Plan [4], Radioactive Waste Management Plan [5], and Radiation Protection Plan [6].

3 AREA OF IMPACT

The proposed ILWCI facility will be located within the 70 hectare Lucas Heights campus which is surrounded by a 1.6 km radius bushland perimeter, or buffer zone. The residential suburbs of Barden Ridge and Engadine are located in the north-east to south-east sectors adjacent to the 1.6 km boundary. The suburban area of Menai is located some 3 km further to the north-east. There is no farming within the bushland perimeter and very little mixed farming within 5 km of the site.

Stormwater runoff to the surrounding watercourses does not contribute to any water catchments for public water supply. The surrounding watercourses flow into the Woronora and Georges Rivers which are used for recreational purposes including fishing. Liquid effluent from the Lucas Heights campus typically comprises 72% trade wastewater, 21% sewage and 7% low level wastewater. Liquid effluent is discharged via ANSTO's main discharge pipeline, combining with the Sutherland Shire sewage water at an agreed minimum dilution factor of 25:1 at the point of entry to the Cronulla Wastewater Treatment Plant (CWTP). A new pipeline project will be transitioned to operations which will be a

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pumped pipeline (rising main) rather than the current gravity drain system. The combined sewage water undergoes tertiary treatment at the CWTP and is ultimately discharged to the ocean at the Potter Point outfall.

4 DISCHARGE CRITERIA

Radioactive discharges to air from ANSTO's licenced facilities pass through HEPA filtration to remove particulates prior to release and are continuously sampled and analysed weekly. Compliance is assessed against the periodic discharge notification levels set by ARPANSA for each facility, as per the relevant licence conditions.

ANSTO is also subject to a restriction on atmospheric discharges that was mandated by the Department of Environment during a review of the Environmental Impact Study (EIS) conducted during the OPAL reactor licensing process. Airborne radioactive discharges must not be increased above these levels. The proposed ILWCI facility will not prevent ANSTO from meeting this requirement.

Effluent discharges to the sewer must comply with the current trade waste agreement between ANSTO and the Sydney Water Corporation (Consent to Discharge Industrial Trade Waste Water #4423 [4]) for discharges from the Lucas Heights campus. Sydney Water conducts independent testing of liquid effluent discharges to sewer and the Trade Waste Agreement is periodically reviewed to provide assurance that ANSTO's discharges remain within authorised radiological and non-radiological limits and pose no threat to the environment.

5 RELEASE TO THE ENVIRONMENT

5.1 Airborne Release

There will be no significant generation of volatile radioactive wastes, gases, dusts or other airborne emissions during the siting of the new facility.

Once operational, the ILWCI facility may produce volatile radioactive wastes, gases, dust or other airborne emissions which will be controlled through an Active Ventilation System (AVS) with a HEPA and carbon filtration unit, supported by continuous stack discharge monitoring.

5.2 Release to Surface or Groundwater

There will be no radioactive or chemical discharge to the environment during the siting of the proposed ILWCI facility.

Once operational, the ILWCI facility will have a safety shower and eye-wash station that drains to either a storage tank or the B-line network which is connected to the site effluent treatment plant. This liquid will then be tested and discharged in accordance with the Trade Waste Consent with Sydney Water Corporation.

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5.3 Monitoring

Environmental monitoring will be carried out by ANSTO's Environmental Monitoring Group following the Environmental Monitoring Program, AG-1304 [4]. This program measures radioactivity levels in local environmental media including surface waters, ground waters, air, sediments, and in the marine biota located near the ocean outlet of the CWTP.

Cumulative annual effective dose from external radiation is monitored at the site perimeter fence, at the CWTP and nearby residences using environmental thermo-luminescent dosimeters (TLDs). Environmental gamma radiation, in terms of dose rates, is available on ANSTO's website and is measured at a station located in the nearby suburb of Engadine, situated to the east of ANSTO.

Weather data is collected from the ANSTO 49 m tower and at two remote locations, Shackles Estate and Engadine. The data collected from the three meteorology stations are primarily used for ANSTO's emergency response system and to determine the quarterly public dose attributed to routine airborne emissions from ANSTO's licenced facilities.

In addition to radiological assessment of nearby river and groundwater, surface water comprising of stormwater runoff leaving the Lucas Heights site is routinely collected and analysed according to the Environmental Monitoring Sampling Schedule, G-3900 [5]. The summarised results are published in the ANSTO Annual Reports and on the ANSTO website.

ANSTO has conducted further environmental evaluations to verify the effective control of authorised emissions to the appropriate standard of radiation protection and to detect any unplanned releases which could impact on the environment. Data from these assessments shows that ANSTO's activities have a negligible effect on local wildlife as described in Section 6.

6 PROTECTION OF WILDLIFE

The proposed ILWCI facility is a solid radioactive waste storage facility that will be constructed within ANSTO's existing operational area and therefore its footprint will not impact the wildlife habitat of the bushland perimeter surrounding ANSTO. Within the facility, there will be no process operations that could generate volatile radioactive wastes, gases, dusts or other airborne emissions in significant quantities.

The most recent assessment of potential radiological impacts to wildlife is detailed in the ANSTO Nuclear Medicine (ANM) Environmental Protection Plan, Q-50323 [6]. This assessment considered both airborne emissions and liquid discharge pathways and conservatively evaluated ANSTO's cumulative potential discharges. The evaluation is summarised as follows:

The assessment used methods from international best practice as laid out by the ARPANSA Guide: Radiation Protection of the Environment, which is consistent with current approaches set forth by the International Commission on Radiological Protection (ICRP) and the International Atomic Energy Agency (IAEA). The screening evaluations considered exposure to a range of terrestrial organisms in the buffer zone from stack emissions via the air pathway, and, to a range of marine organisms near the

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ocean outlet at Potter Point, New South Wales via the liquid effluent pathway. Dose assessments were performed using the ERICA tool with radioactivity concentrations for air and water determined from data collected during routine monitoring of stack emissions and effluent releases at ANSTO. Concentration values along air and water pathways were overestimated, consistent with an approach of using conservative assumptions in this screening assessment.

In summary, despite using overestimates for radioactivity concentrations associated with ANSTO's emissions, results indicate potential risk quotients that are below standard benchmarks for all organisms and all pathways considered. Dose rates to organisms were determined to be below the lowest benchmark for potential harmful effects ($10 \mu\text{Gy hr}^{-1}$). These results are consistent with previous studies in determining no significant impacts from ANSTO effluents. Therefore, potential radioactivity releases from the ANM Facility are unlikely to impact local wildlife. Although projected dose rates are low, the release of low levels of radionuclides in air and water discharges indicates the need for ongoing monitoring and periodic re-evaluation.

Given the lack of discharges/emissions, operation of the ILWCI facility will not change the existing level of radiological protection of wildlife at ANSTO.

For further details, see: "Screening assessment of dose rates to wildlife related to the Nuclear Medicine Mo99 Facility, ANSTO, March 2017, ANSTO-E-785" [7].



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7 REFERENCES

- [1] Australian Radiation Protection and Nuclear Safety Agency, "Australian Radiation Protection and Nuclear Safety Act," C2016C00977, Act No 133, 2016.
- [2] Australian Radiation Protection and Nuclear Safety Agency, "Australian Radiation Protection and Nuclear Safety Regulations," F2019C00829, 2019.
- [3] ARPANSA, "Regulatory Guide: Plans and arrangements for managing safety," REG-LA-240B, v6.2, 2019.
- [4] S. W. Corporation, "Consent to Discharge Industrial Trade Waste Water #4423," Sydney.
- [5] ANSTO, "Environmental Monitoring Program," AG-1304, rev 4, 2016.
- [6] ANSTO, "Environmental Monitoring Sampling Schedule 2020-2021," G-3900, rev 19, 2020.
- [7] ANSTO, "ANM Environmental Protection Plan," Q-50323, rev 0, 2017.
- [8] ANSTO, "Screening assessment of dose rates to wildlife related to the Nuclear Medicine Mo99 Facility," E-785, 2017.