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Little Forest Legacy Site Licence Application

Document LFBG-PC-LA-SS

LITTLE FOREST LEGACY SITE
'POSSESS OR CONTROL' LICENCE
SAFE STORAGE AND MAINTENANCE ARRANGEMENTS OF THE FACILITY

(rev 1)

Prepared By

Australian Nuclear Science and Technology Organisation

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0	Original issue	Kate Lucas Alamgir Kabir	Duncan Kemp	Hefin Griffiths
1	Revised Sections 4.2.1 *Soil Survey*, 4.2.2. *Ground Water Monitoring*, 4.2.4 *Airborne Contamination Monitoring*, 4.2.6 *Security surveillance program.*	Kate Lucas 29/08/14 Alamgir Kabir 29/08/14	Duncan Kemp 1/9/14	Hefin Griffiths 29/8/14.

CONTENTS

1 PURPOSE AND SCOPE

The purpose of this document is to describe the organisational arrangements and procedures for the safe storage of controlled material and maintenance of the Little Forest Legacy Site (LFLS) Facility during the Possess and Control period.

The ARPANS Act and Regulation 39 [1, 2] empower the CEO, ARPANSA to request some or all of the information in Part 1 of Schedule 3 of the ARPANS regulations. Items 13 and 14 of Part 1 of Schedule 3 of the regulations state:

13. The arrangements for maintaining criticality safety during loading, moving or storing nuclear fuel and other fissile materials at the controlled facility.

14. The arrangements for safe storage of controlled material and maintaining the controlled facility.

Item 13 is not relevant to this licence application as there are only very small amounts (gram quantities only) of fissile materials located at the LFLS and the risk of criticality under all normal conditions and credible abnormal conditions is precluded. This plan addresses the requirements of item 14 and should be read in conjunction with other plans, specifically those relating to effective control, radiation protection, security and waste management.

ANSTO is seeking an approval for a 'possess or control' licence application of the LFLS. The licence application was originally submitted to ARPANSA in 1999 and ANSTO is updating all the documentation and providing additional information and clarifications to the original licence application. This document forms the part of that supporting information of the 'possess or control' licence application

2 RESPONSIBILITIES

ANSTO, as the licence applicant, has responsibility for the management of the LFLS. The CEO of ANSTO has delegated responsibility for the safe management of the facility to the Head, Nuclear Services group during the period that this licence remains in force. The Operating Organisation for this period, with roles, responsibilities and lines communication of key personnel, is described in detail in the Effective Control Plan LFBG-PC-LA-D1.

The Head of the Nuclear Services group is the Licence Nominee for the LFLS and has overall responsibility for the maintenance of and safety of activities undertaken at the facility at all times, consistent with ANSTO policies and general arrangements. The Nominee is delegated to make, amend or vary the application in the name of ANSTO, pursuant to paragraph 34(a) of the ARPANS Act 1998 and regulation 39 of the ARPANS Regulations 1999.

The Head Nuclear Services has delegated responsibility for implementing these Plans to the Manager Waste Operations (WO) who is responsible for planning and managing resources to ensure the safety of activities undertaken in the site and the effective maintenance and control of the site.

3 SAFE STORAGE ARRANGEMENTS

The LFLS was used for the disposal of waste from 1960-1968 and has been under a program of care and maintenance since the cessation of disposal operations 45 years ago (see LFLS Facility Description for further details on waste disposal). The wastes are located within trenches nominally 25 m long by 0.6 m wide by 3 m deep with a ~1 m deep layer of local clay soil above the buried waste. There are 2 main trench sets of 120 m long x 25 m (comprising 51 trenches) and 75 m long x 25 m wide (comprising 26 trenches) which are located at adjoining locations at the north part of the LFLS (**Figure 1**). There are also two trenches positioned south of the main trenched areas (S1 and S2).

The continuing safe storage arrangements at the LFLS constitute appropriate physical and surveillance controls, maintenance and environmental monitoring to ensure that the wastes are properly secured and do not pose a risk to ANSTO personnel, the local community or environment.

The site perimeter is secured by a high cyclone wire fence (2.4 m with 3 strands barbed wire) with cable reinforcement (20 mm thick and 50 cm from the ground). Bollards have been placed at the gate entrance and along a section of the north fence to prevent the unauthorised entry of vehicles by force.

All environmental monitoring activities at the LFLS have been undertaken with precautions to avoid or minimise disturbance to the waste disposal trenches. Groundwater monitoring bores have been drilled in areas between or outside of the trenched areas. A single trench sampling point (**Figure 1**) is the only location at which the trenched area is penetrated from the surface and this was installed in a manner avoiding interference of the buried objects.

Any change in the storage conditions of waste items is attributed to the development of voids from the deterioration (corrosion) of the disposed objects which may result in subsidence. Areas of subsidence are dressed with layers of local clay soil to maintain a level surface. The native grass covering is maintained to protect the surface soil above the trenched areas from wind and water erosion.

4 MAINTENANCE PLAN

The maintenance plan includes the routine inspection and general maintenance activities at the site. It also covers the routine surveillance program undertaken by the Environmental Monitoring Group. These are discussed in the sub-sections below.

4.1 Routine inspection and general maintenance

The site is routinely inspected by ANSTO's Waste Operations (WO) staff to check the overall condition of the trenches. The entire fenced area is regularly mown to control the growth of vegetation (i.e. mostly grass) which is left on the ground after mowing. The access road around the site is routinely inspected and maintained in good condition by the ANSTO Support Services group and WO.

Repair and maintenance tasks are carried out to the fence on a regular basis.

Top soils are added over the rain-affected trenches as and when required and the grass covering is maintained over the trenched areas.

4.2 Surveillance program

4.2.1 Soil survey

Past gamma dose-rate surveys of the LFLS trenches have not resulted in the detection of dose rates above background levels and do not provide an effective means of determining the presence of elevated levels of radionuclides (with respect to background levels). The trench surfaces are visually assessed bi-annually in addition to general inspection of the trenches when conducting other monitoring activities.

4.2.2 Ground water monitoring

Ground water monitoring is undertaken to detect any off-site migration of radionuclides from the buried waste by ground water transportation. There are 19 bores that are routinely monitored as shown in **Figure 1**. Biannually the field parameters for each bore are recorded (Sampling depth, standing water level, temperature, EC, pH, Eh, etc) and each sample is analysed using Liquid Scintillation Counting (for H-3). On an annual basis each sample is additionally analysed using Gas Flow Proportional Counting (for gross alpha and beta radioactivity) and HPGe Gamma Spectrometry (the main gamma-emitters of interest are Am-241, Cs-137, Co-60 and K-40 but other nuclides are reported if detected).

4.2.3 Radiation monitoring

Environmental dosimeters are located within the LFLS compound to measure the background radiation level. There are two thermoluminescent detectors (TLDs) that are measured quarterly; one is located between the main trench sets and the other is positioned towards the south as indicated by the black markers labelled 20 and 21 respectively on **Figure 1**.

4.2.4 Airborne contamination monitoring

Airborne contamination monitoring is carried out on a quarterly basis at the site to detect any potential off-site migration of stable Be and $^{239+240}$Pu by windborne transport of surface particles. A Hi-Volume air sampler is taken to the site for fortnightly sampling on a single cellulose filter over three months. The sampler is left to run for approximately 4 hours each sampling day and the filter is analysed quarterly.

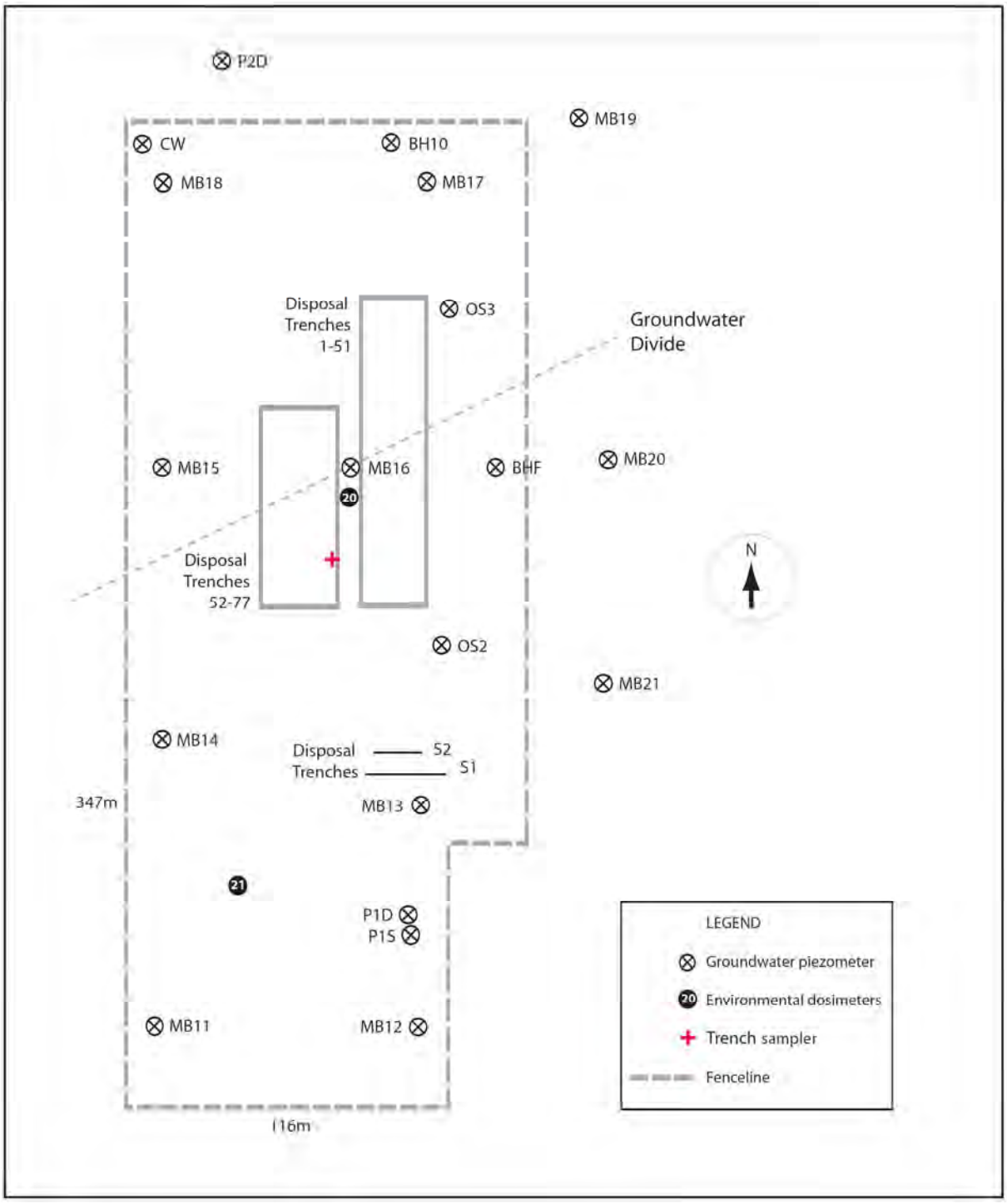

Figure 1 – Schematic of the LFLS showing the waste disposal trenches and groundwater bores sampled during regular ANSTO monitoring. The trench sampler (red) is not routinely monitored.

4.2.5 Soil sampling

The LFLS trenches are visually inspected for depressions during the groundwater sampling campaigns and the dose rate of any depressions is measured. Soil and surface water (if present) are collected from the depression area if the dose rate is greater than 3 times the background to identify the radionuclides responsible for the elevated dose-rate.

Soil samples are dried, sieved and analysed for gross alpha and beta radioactivity and by HPGe gamma spectrometry. Water samples are analysed using liquid scintillation counting (LSC) for tritium,

gas flow proportional counting (GFPC) for gross alpha and beta radioactivity and HPGe gamma spectrometry for specific radionuclides (dependent on the volume of water collected).

4.2.6 Security surveillance program

As part of the security surveillance program for the LFLS, Australian Federal Police (AFP) patrols the site daily (at night during the week and during the day on the weekends). Further information regarding the program is discussed in the LFLS Security Plan.

5 INTERNATIONAL BEST PRACTICE

The ongoing maintenance and routine monitoring plan for the site during its 'possess and control' period are consistent with the international best practice described in the relevant IAEA Safety Guide [3].The monitoring/surveillance program for the site addresses the wide range of elements and parameters that the IAEA Guide specifies are to be monitored during the 'possess and control' period. The program for the 'possess and control' period also specifically identifies the frequency of routine inspections and surveys of the instruments, sensors, security operations etc.

ANSTO routinely reviews its current monitoring and inspection program for the site and as part of this, ANSTO will incorporate additional monitoring activities that are generated by the research program which is undertaken by the Institute of Environmental Research (IER).

The short-term management strategy described in this document includes undertaking localised remediation actions based on any elevated levels of surface activity identified by the monitoring programme. Any soil removed will be appropriately packaged and transported to Lucas Heights and processed appropriately in accordance with the Waste Operations Licence F0260.

The medium term strategy for the 'possess and control' period will be developed during calendar year 2014 with the aim of maintaining the safe condition of the LFLS into the future. Based on the extensive knowledge of the site characteristics and behaviours, the strategy will focus on maintaining the integrity of the structural barriers of the trench and providing further engineered barriers to prevent as far as reasonably practicable, the ingress of ground water or surface rainwater into the trench structures. The long term management strategy for the LFLS site is to assess the outcome of the medium term plan and extend to the point where a final determination has been made as to the disposition of the LFLS and the material contained therein.

6 REFERENCES

1 Australian Radiation Protection and Nuclear Safety (ARPANS) Act 1998

2 Australian Radiation Protection and Nuclear Safety (ARPANS) Regulations 1999

3 IAEA Specific Safety Guide No. SSG-14, Geological Disposal Facilities for Radioactive Waste, IAEA, 2011.