



Australian Government

Australian Radiation Protection and Nuclear Safety Agency

Statement of Reasons

Decision by the CEO of ARPANSA on Facility Licence Application
A0293 from the
Australian Nuclear Science and Technology Organisation (ANSTO)
to Possess or Control the

Little Forest Legacy Site

R15/05292

9 July 2015

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1 The licence decision

On 9 July 2015, I decided to issue a licence under section 32 of the *Australian Radiation Protection and Nuclear Safety Act 1998* (the Act¹), to the Australian Nuclear Science and Technology Organisation (ANSTO), to *possess or control* a controlled facility known as the *Little Forest Legacy Site* (referred to as LFLS in this Statement of Reasons). The facility is located approximately 1.6 km north of the Lucas Heights Science and Technology Centre (LHSTC) and was formerly known as the *Little Forest Burial Ground*.

The LFLS was originally constructed as a disposal facility². However, the licence application³, dated 10 October 2014 and signed by the Chief Executive Officer (CEO) of ANSTO, Dr Adrian Paterson, categorises the facility as a nuclear waste *storage facility* which is a type of *nuclear installation* under the Australian Radiation Protection and Nuclear Safety Regulations 1999 (the Regulations⁴).

I am satisfied that the current state of the facility will fulfil the safety objective (i.e. to protect the health and safety of people and the environment from the harmful effects of ionising radiation) in the short term (several years).

Under section 35 of the Act I may impose licence conditions when I issue a licence. I have included a licence condition which relates to annual reporting of key parameters for the LFLS. While I am satisfied that ANSTO has adequately demonstrated that arrangements are in place for the short-term management of the facility, it is recognised that this is the first in a series of licence decisions on the future management of the wastes and the facility. Therefore, a plan is needed to address the arrangements for managing the wastes and the facility over the medium term (several years to one to two decades). Management over the long-term (beyond one to two decades) also needs to be determined. The medium and long term management plan needs to be sufficiently well developed, with contingency plans identified, to cope with foreseeable changes in Australia's radioactive waste management policy. This plan should be developed in a timely fashion and updated as necessary.

Based upon the above, I have therefore imposed the following conditions of licence:

Environmental Monitoring Programme

1. The licence holder must undertake an environmental monitoring programme approved by the CEO of ARPANSA.

Reporting

2. The licence holder must provide to the CEO of ARPANSA within twenty-eight (28) days of the end of each financial year, information about its compliance with the Act, the Regulations and Licence Conditions during the previous year. The annual report must also include:

¹ *The Australian Radiation Protection and Nuclear Safety Act 1998*,

<http://www.arpansa.gov.au/Regulation/legislation/index.cfm>

² Australian Atomic Energy Commission, "*The Little Forest Burial Ground – An Information Paper*",

<http://apo.ansto.gov.au/dspace/bitstream/10238/811/1/AAEC-DR-19.pdf>

³ Application submitted by the Australian Nuclear Science and Technology Organisation to possess or control the LFLS,

<http://www.arpansa.gov.au/regulation/Branch/littleforest.cfm>

⁴ *The Australian Radiation Protection and Nuclear Safety Regulations 1999*,

<http://www.arpansa.gov.au/Regulation/legislation/index.cfm>

- A status update on the integrity of the facility trenches
- Any change to the condition of the land surrounding the facility's trenches
- Information collected through the environmental monitoring programme and the results of the data analysis

Planning

3. The licence holder must provide the CEO of ARPANSA with a plan for the medium and long term management of the Little Forest Legacy Site by 30 June 2018. This plan must include options for future disposition of the inventory of radioactive waste, including contingency plans to accommodate changes in Australia's national radioactive waste management policies.

2 Reaching the decision

2.1 Background

In 1999, the Australian Nuclear Science and Technology Organisation (ANSTO) submitted an application for a facility licence, relating to what is now known as the Little Forest Legacy Site, LFLS. However, at that time, no regulatory decision was made. A new application was received on 10 October 2014. The new application was for authorisation to *possess or control a nuclear installation* known as the LFLS.

The facility was established by the former Australian Atomic Energy Commission (AAEC) for the near surface burial of low level wastes. The facility was operational between 1960 and 1968. During this time, a number of shallow trenches were excavated and about 1600 cubic metres of material was buried. The material consisted of equipment and waste contaminated with radioactive substances of low activity, effluent sludge, chemicals and beryllium. After emplacement of the waste, a one metre thick layer of local clay-rich soil was used to cover the waste.

A major consideration in my decision making is that the facility is currently unlicensed, and therefore, technically, not subject to regulatory oversight under the provisions of the Act. For the purpose of this application, and for bringing the facility under ARPANSA's regulatory control, ANSTO proposes that the facility is licensed as a *storage facility* being a *nuclear installation*. It should be noted that the LFLS in the international framework for managing radiation risks is considered an 'existing exposure situation', which means that the situation is already in existence when a decision on control has to be made, and operational controls applicable to a 'planned exposure situation' cannot be retrofitted to the facility. This has some consequences for the reasoning underpinning the decision, which will become clear in subsequent sections of this Statement of Reasons.

In issuing the licence I am satisfied that the facility is performing safely. However, as the facility was already in existence when ANSTO applied for the licence, I could not consider certain factors when making my decision because those factors were considered and determined when the facility was established in 1960 and it is impossible to revisit those factors now. These are as follows:

- the suitability of the site for radioactive waste disposal, including location;
- the design of the trenches; and,
- the design of the containers used to hold the waste.

However, these factors are important for ongoing safety and for the condition of the wastes emplaced - and the performance of the facility as a whole - and will be taken into consideration in decisions regarding future management of the wastes and the facility. I therefore consider this decision to be the first in a series of decisions that will establish a long-term regulatory and safety regime for the wastes emplaced in the LFLS, as well as for the facility as such and the site more generally.

2.2 The documentary evidence

The information used in the review of the application, and the conclusions of the reviewers, are documented in the Regulatory Assessment Report (RAR) R15/05291⁵.

The primary evidence before me was the application and the following:

- a. the RAR referred to above;
- b. international guidance relevant to international best practice (IBP) – consideration of IBP is mandated in the Act;
- c. regulatory guidance material, developed for applicants and for ARPANSA reviewers, as referred to in the RAR and in this Statement of Reasons;
- d. the Radiation Protection Series suite of documents developed to support and promote national uniformity in radiation protection and nuclear safety across Australian jurisdictions;
- e. the Radiation Health Series suite of documents formerly published by the National Health and Medical Research Council (NHMRC);
- f. discussions on the subject held with the Nuclear Safety Committee (NSC); information on NSC and summary of meetings are available on the ARPANSA website⁶; and,
- g. submissions received during the public consultation period.

2.2.1 The Regulations

Sub-regulation 41(3) stipulates matters the CEO must take into account in deciding whether to issue a facility licence. These are:

- a. whether the application includes the information asked for by the CEO;
- b. whether the information establishes that the proposed conduct can be carried out without undue risk to health and safety of people, and to the environment;
- c. whether the applicant has shown that there is a net benefit from carrying out the conduct relating to the controlled facility;
- d. whether the applicant has shown the magnitude of individual doses, the number of people exposed, and the likelihood that exposure will happen, are as low as reasonably achievable, having regard to economic and social factors;
- e. whether the applicant has shown a capacity for complying with these regulations and the licence conditions that would be imposed under section 35 of the Act;
- f. whether the application has been signed by an office holder of the applicant, or a person authorised by the office holder of the applicant; and

⁵ Australian Radiation Protection and Nuclear Safety Agency, "Regulatory Assessment Report: Facility Licence Application A0293", www.arpansa.gov.au/pubs/regulatory/ansto/LFLS_AssessmentRpt.pdf.

⁶ <http://www.arpansa.gov.au/AboutUs/Committees/nscmt.cfm>

- g. if the application is for a facility licence for a nuclear installation – the content of any submissions made by members of the public about the application.

2.2.2 Other matters

Schedule 3, Part 1 of the Regulations specifies information that may be requested by the CEO – and that, if submitted, will be considered by the CEO when making a decision. ARPANSA has issued guidelines to applicants applying for a licence to *possess or control* a controlled facility⁷. Matters referred to in Schedule 3, Part 1 of the Regulations have been considered in the RAR and in this Statement of Reasons.

My decision is further informed by ARPANSA’s ongoing licensing activities and compliance monitoring of activities at ANSTO. This is not part of the information provided in support of the application and on which my decision is based. Any such information that I am aware of may, however, improve my understanding of matters of general importance to, and my confidence in, the safety of operations at ANSTO.

For the purpose of my Statement of Reasons, the phrase ‘*health and safety*’ refers to all factors that contribute to *protection of people and the environment from the harmful effects of ionising radiation*, which includes radiation protection and safety, nuclear safety, waste safety, transport safety, physical protection and security, and emergency preparedness and response, unless any such factor is referred to specifically. Consideration of safety as it relates to other matters, e.g. as covered in the work health and safety legislation, is outside of the ARPANSA jurisdiction.

3 Reasons for my decision

In this section, I summarise considerations in relation to the evidence before me, against the provisions set out in the Act and the Regulations. Consideration is given to IBP in section 3.1. I deal with the issues specified in sub-regulation 41(3) in sections 3.2 to 3.7, and to matters detailed in Schedule 3, Part 1 of the Regulations, as and when relevant.

3.1 International best practice

The Act stipulates that the CEO, in issuing a facility licence, must take into account international best practice (IBP) in radiation protection and nuclear safety as it relates to the application and any matter specified in the Regulations. I briefly review elements of IBP below.

3.1.1 The ‘Joint Convention’

Australia is a Contracting Party to the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of the Radioactive Waste Management*⁸ (the Joint Convention). Having signed and ratified this Convention, Australia is obligated to review:

“the safety of any radioactive waste management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary,

⁷ Australian Radiation Protection and Nuclear Safety Agency, *Regulatory Guide: Possess or Control of a Controlled Facility, Controlled Apparatus or Controlled Material*, www.arpansa.gov.au/pubs/regulatory/guides/REG-LA-SUP-240X.doc.

⁸ <https://www.iaea.org/publications/documents/infcircs/joint-convention-safety-spent-fuel-management-and-safety-radioactive>

all reasonably practicable improvements are made to upgrade the safety of such a facility”.

The LFLS has been continually monitored by ANSTO (e.g. in terms of migration of radioactive substances, structural integrity and access control), which has provided reassurance that the facility, during its half century of existence, has not (and still does not) posed a radiological risk of concern to workers, the public or the environment. The application submitted by ANSTO has demonstrated that a review of the safety of the LFLS has been completed. The current licensing process is aimed at bringing the facility under regulatory control and will provide a mechanism for ensuring that radiation risks are managed in the medium and long term. I consider that, in this regard, Australia is acting in accordance with the provisions of the Joint Convention.

3.1.2 The IAEA Safety Series and Recommendations of the ICRP

The International Atomic Energy Agency (IAEA) has developed a hierarchical structure of safety standards within its Safety Series. At the top of this structure are the *Safety Fundamentals*⁹, which outline ten safety principles that support achieving the safety objective¹⁰. These principles have been implemented in Australia through ARPANSA's *Fundamentals – Protection Against Ionising Radiation* (RPS F-1)¹¹, which is the top level document in the nationally consistent system of Codes and Guides published by ARPANSA in the Radiation Protection Series (RPS). These are applicable to safety, security and radiation protection of all facilities, exposure situations and categories of exposure (occupational, public, medical and environmental).

Principle 10 of RPS F-1 applies to unregulated sources or activities such as legacy sites, and states as follows:

“Protective actions to reduce existing or unregulated radiation risks must be justified and optimised.”

RPS F-1 elaborates on this principle by stating that:

“Radiation risks may arise in situations other than in facilities and activities that are in compliance with regulatory control. In such situations, if the radiation risks are relatively high, consideration has to be given to whether protective actions can reasonably be taken to reduce radiation exposures, and whether the particular circumstance giving rise to the radiation exposure can be, or should be, brought under regulatory control.”

The international framework for management of radiation risks deals with legacy sites as ‘existing exposure situations’ as defined by the International Commission on Radiological Protection (ICRP) in *Publication 103*¹²; the generic application of the principles of radiation protection to existing exposure situations was outlined by ICRP in *Publication 104*¹³.

⁹ International Atomic Energy Agency, “IAEA Safety Standards SF-1: Fundamental Safety Principles”, http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1273_web.pdf

¹⁰ The safety objective is to “...protect people and the environment from the harmful effects of ionizing radiation”.

¹¹ ARPANSA 2014, <http://www.arpansa.gov.au/publications/codes/fundamentals.cfm>

¹² International Commission on Radiological Protection, “The 2007 Recommendations of the International Commission on Radiological Protection”, (available at: <http://www.icrp.org/publication.asp?id=ICRP Publication 103>).

¹³ International Commission on Radiological Protection, “Scope of Radiological Protection Control Measures”, (available at: <http://www.icrp.org/publication.asp?id=ICRP Publication 104>).

Requirements on how to deal with radiation risks associated with existing exposure situations have been outlined by the IAEA in its *Basic Safety Standards, BSS*¹⁴. This includes the establishment of protective ambitions in terms of reference levels that guide optimisation of protection, discussed later in this Statement of Reasons¹⁵.

I note that originally, LFLS was designed to be 'disposal facility'; it has subsequently been re-designated as a 'storage facility'. I observe that radioactive waste disposal facilities and storage facilities bear many similarities. International best practice and expectations on performance have been discussed in ARPANSA's Regulatory Guide: *Licensing of Radioactive Waste Storage and Disposal Facilities*¹⁶. To the extent practicable, radioactive waste should be managed in accordance with the concept of 'passive safety'¹⁷. The radioactivity should be immobile, the waste form, and its container, should be physically and chemically stable, and resistant to degradation. Furthermore, there should not be a need for prompt corrective action to ensure safety of the facility. Whilst I am satisfied that the LFLS does not pose an undue risk in the short-term, and that the application of protective principles to an existing exposure situation poses specific problems, I expect that the measures to be put forth in the medium and long term plan will provide adequate consideration of the role of passive safety in achieving the safety objective.

While not fully applicable to an existing exposure situation, I expect that ANSTO will make use of the concept of *safety case*, being the collection of arguments and evidence that describe, quantify and substantiate the safety, and the level of confidence in safety, of a waste facility. Relevant guidance can be found in the Regulatory Guide: *Licensing of Radioactive Waste Storage and Disposal Facilities*, referred to earlier.

¹⁴ International Atomic Energy Agency, "IAEA Safety Standards: Radiation Protection and Safety of Radiation Sources: *International Basic Safety Standards*", (available at: <http://www-ns.iaea.org/standards/review-of-the-bss.asp?s=11&l=88>).

¹⁵ The relevant Safety Requirements are:

Requirement 47: Responsibilities of the government specific to existing exposure situations: *The government shall ensure that existing exposure situations that have been identified are evaluated to determine which occupational exposures and public exposures are of concern from the point of view of radiation protection.*

Requirement 48: Justification for protective actions and optimization of protection and safety: *The government and the regulatory body or other relevant authority shall ensure that remedial actions and protective actions are justified and that protection and safety is optimized.*

Requirement 49: Responsibilities for remediation of areas with residual radioactive material: *The government shall ensure that provision is made for identifying those persons or organizations responsible for areas with residual radioactive material; for establishing and implementing remediation programmes and post-remediation control measures, if appropriate; and for putting in place an appropriate strategy for radioactive waste management.*

¹⁶ ARPANSA 2013, <http://www.arpansa.gov.au/pubs/waste/WasteGuide-March2013.pdf>

¹⁷ The concept of passive safety is also acknowledged in the regulatory guide published by ARPANSA "Possess or Control of a Controlled Facility, Controlled Apparatus or Controlled Material", <http://www.arpansa.gov.au/pubs/regulatory/guides/REG-LA-SUP-240X.pdf>

3.1.3 Conclusions

With regard to International Best Practice:

I consider that LFLS is appropriately designated an 'existing exposure situation' and that the regulatory and management actions should be based on principles governing management of radiation risks from existing exposure situations, while also taking into account requirements for passive safety as applied in 'planned exposure situations' and as appropriate consider development of a safety case.

I consider that ANSTO has demonstrated an approach to addressing radiation risks emanating from LFLS in a manner that is aligned with the international framework for managing radiation risks; and, that LFLS should be brought under regulatory control that conform to the international system for managing radiation risks.

I conclude that the proposed conduct is in sufficient alignment with International Best Practice to allow me to proceed to other matters in reaching a decision on the authorisation to *possess or control* a controlled facility.

3.2 Does the application include the information asked for by the CEO?

In this section I consider information submitted in support of the application, *viz*:

- the purpose of the facility;
- the description of the facility and the site;
- the arrangements for the safe management of the facility;
- the arrangements for maintaining criticality safety at the LFLS; and
- the arrangements for safe storage of the radioactivity at the site and maintaining the LFLS.

3.2.1 Purpose of the facility

The AAEC started disposing of radioactive and other wastes at the LFLS in 1960. The conduct was not inconsistent with international practice at the time. Approximately 1,600 m³ of waste was emplaced in a series of trenches that were excavated into the clay rich soil. The facility was closed in 1968. No wastes have been added to the site since.

The trenches are approximately 25 metres long by 0.6 metres wide by 3 metres deep. The space between each of the trenches was nominally 2.7 metres. After the waste had been placed in the trench, 1 metre of top soil was added. Native grass prevents erosion of surface soil by wind and rain.

3.2.2 The facility and the site

The LFLS is situated on a cleared block of land with an area of almost 50,000 square metres. The facility was established by AAEC for the purpose of near surface burial of low level wastes. The facility was adjacent to other, unrelated, disposal sites. These sites were used for the disposal of industrial liquid wastes (e.g. grease, paints, solvents, materials contaminated by dioxins and residues from the production of herbicides), the disposal of night soil (human excreta) and municipal waste disposal.

The AAEC, and later ANSTO, has managed and maintained the site since it was closed. This has included mowing the grass that covers the facility, and the addition of topsoil to the surface in the event of subsidence occurring. Environmental monitoring has also been conducted. This has included gamma dose rate surveys, water monitoring (groundwater and creeks), soil sampling and particulate air sampling.

3.2.3 The arrangements for management of safety

The application provides details of the arrangements in place to manage safety of the facility. These arrangements include details of the management structure (and associated responsibilities), business management system, and method of identifying - and managing - hazards at the facility. The ARPANSA reviewers have concluded that they form an adequate basis for management of safety at the LFLS.

3.2.4 The arrangements for criticality safety

The analysis of criticality safety concluded that criticality is not feasible given that only very small amounts (gram quantities) of fissile materials are recorded to have been buried at the LFLS. This analysis has considered all normal conditions and credible abnormal conditions. The ARPANSA reviewers have concluded that it forms an adequate basis for criticality safety at the LFLS.

3.2.5 The arrangements for safe storage of radioactive waste at the site and for maintaining the facility.

The site has been under a programme of care and maintenance since the cessation of disposal operations almost 50 years ago. In order to ensure that the wastes do not represent a risk to ANSTO personnel, the local community or the environment, ANSTO has put in place maintenance and environmental monitoring programmes as well as physical and surveillance controls to maintain security. If the monitoring programme detects elevated levels of radioactivity at the surface, localised remediation will be conducted. This will be done through the addition of local clay-rich soil.

ANSTO has committed to developing a strategy to manage the facility over the medium and long terms. The strategy for the medium term is expected to concentrate upon maintaining the structural integrity of the trenches and minimising the amount of water entering the trenches. This may be achieved by engineered works. The long-term management of the facility will be informed by the results of the medium term results and will address the future of the facility up to the point where a final decision can be made with regard to the waste and the facility.

3.2.6 Conclusions

The ARPANSA reviewers have considered the material submitted by ANSTO in support of the application, as recorded in the RAR. The ARPANSA reviewers concluded that sufficient and satisfactory information has been provided in relation to the issues identified above. I agree with these conclusions.

With regard to whether the information provided in the application includes information asked for by the CEO:

I consider that ANSTO has provided satisfactory details describing the LFLS in order to enable me to proceed with reaching a decision on the authorisation to *possess or control* a controlled facility.

3.3 Does the information establish that the proposed conduct can be carried out without undue risk to health and safety of people, and to the environment?

The RAR concludes that the application to *possess or control* the LFLS has included information that establishes that acceptable controls are in place for the proposed conduct. This includes measures to limit access to the facility, and therefore, limit the number of personnel exposed to radiation at the site as well as securing the structural integrity. Further to this, there are programmes in place to monitor the site in order to better understand processes within the trenches with the ultimate goal to predict the movement of radioactivity at the site, and if necessary, manage any resulting radiation exposures of workers and the public. I agree with the conclusions reached by the ARPANSA assessors.

3.3.1 Conclusions

With regard to whether the information establishes that the proposed conduct can be carried out without undue risk to health and safety of people, and to the environment:

I consider enough evidence is before me regarding the plans and arrangements for safety at the LFLS to enable me to proceed with reaching a decision on authorisation to *possess or control* a controlled facility.

3.4 Has the applicant shown that there is a net benefit from carrying out the conduct relating to the controlled facility?

The issue of net benefit relates to the principle of *justification* in the international framework for safety and is considered in judging whether the activity leading to exposure does more good than harm. This is reflected in ARPANSA's *Fundamentals: Protection Against Ionising Radiation*, RPS F-1.

Principle 4 on *justification* of RPS F-1 states that:

“Facilities and activities that give rise to radiation risks must yield an overall benefit.”

The principle is elaborated on as follows:

*“The principle of **justification** requires that any decision that alters a radiation exposure situation should do more good than harm. Introducing a new radiation source, reducing existing exposure or reducing the risk of potential exposure should achieve a sufficient individual or societal benefit to offset any detriment caused. When activities involving an increased or decreased level of radiation exposure, or a risk of potential exposure, are being considered, the expected change in radiation detriment should be explicitly included in the decision-making process.”*

The LFLS is considered to be an existing exposure situation; in deciding whether to take some action in order to avert further exposure, the disadvantages of the action should be considered and the action should be justified in the sense that it is expected to do more good than harm.

For the purpose of the particular decision discussed in this Statement of Reasons, the issue is not whether a physical action should be made (and the implications of that action), but about bringing

the LFLS under regulatory control. The benefit of this is that future actions (or immediate actions if any should be considered justified), which may affect the safety of the waste and the LFLS, and pathways of exposure, can be undertaken within a framework based upon best practice in managing radiation risks.

3.4.1 Conclusions

The issue of net benefit appears straightforward inasmuch this decision enables management of the wastes and LFLS within an established regulatory framework.

With regard to whether the applicant has shown that there is a net benefit from carrying out the conduct relating to the controlled facility:

I consider there is a net benefit resulting from bringing the conduct under ARPANSA's licensing regime to enable me to proceed with reaching a decision on authorisation to *possess or control* a controlled facility.

3.5 Has the applicant shown that the magnitude of individual doses, the number of people exposed, and the likelihood that exposure will happen, are as low as reasonably achievable, having regard to economic and social factors?

The issue considered under this heading relates to the principle of *optimisation* and rests on the international framework for managing radiation risks. *Principle 5 optimisation* of RPS F-1 states:

"Protection must be optimised so that radiation risks are as low as reasonably achievable."

The principle in essence means that all reasonable effort (from cost and societal perspectives) should be made to reduce doses, the number of people exposed, and the likelihood of exposure; exposures should be *as low as reasonably achievable*, or ALARA. For an existing exposure situation, the ICRP as well as the IAEA recommend the use of reference levels to guide optimisation efforts. RPF F-1 elaborates on this issue as follows:

*In the case of existing exposure situations and emergency exposure situations, there will be some level of dose (or risk) above which it is judged to be inappropriate to allow exposures to occur and for these cases remedial action will almost always be justified. This level of dose or risk is used to set a **reference level**. The reference level, once defined, guides the optimisation efforts for protection of both the public and of workers. A reference level may be expressed in terms of e.g. dose, dose rate, activity or activity concentration.*

ANSTO has assessed the foreseeable doses to workers and the public. ANSTO has also assessed the doses to wildlife. These doses have been considered against the *derived consideration reference levels* that have been defined by the ICRP in its *Publication 108*¹⁸ to guide efforts to optimise environmental protection. Each of the categories of exposure is addressed below.

3.5.1 Exposure of workers

ANSTO has committed to the principle of optimisation and intends to keep the magnitude of individual worker doses, the number of workers exposed, and the likelihood of exposure occurring,

¹⁸ International Commission on Radiological Protection, Publication 108, *Environmental Protection - the Concept and Use of Reference Animals and Plants*, [http://www.icrp.org/publication.asp?id=ICRP Publication 108](http://www.icrp.org/publication.asp?id=ICRP%20Publication%20108)].

as low as reasonably achievable (ALARA), whilst taking economic and social factors into account. ANSTO intends to do this by using task-dependent dose constraints and through the use of safe work method and environmental statements (SWMES) and risk assessments to identify radiological hazards and implement optimised levels of control.

It should be noted that even though LFLS is an existing exposure situation, the dose limits for occupational exposure used for planned exposure situations continue to apply for ANSTO workers and contractors, and ANSTO should take the necessary actions to optimise worker protection based on the LHSTC-wide dose constraints – or if deemed appropriate on dose constraints derived for the specific purpose of managing LFLS.

3.5.2 Exposure of the public

At this point in time, there is no credible scenario that leads to exposures of concern (to people and organisms in the environment). A number of environmental monitoring instruments and devices are located at the site. These are used as part of the environmental monitoring programme which provides an assurance that the facility does not represent a source of exposure to the public of concern. ANSTO's Institute of Environmental Research has been studying the site in order to predict the movement of radioactivity at the site, and if necessary, mitigate radiation exposures.

The ARPANSA reviewers proposed that reference levels for public exposure, expressed as annual effective dose and guiding optimisation efforts, should be established for the facility. While I agree that this particular issue warrants careful consideration in the next few years, I am of the view that such reference levels should be established at a time when more information is available as to the features, events and processes that govern the evolution of the LFLS, to guide planning of medium and long term management of the radioactive wastes as well as the facility itself. There is no immediate need to benchmark management strategies against reference levels expressed as annual effective dose.

I do, however, agree with the reviewers that future consideration of management options (and optimisation) by ANSTO should be made with the lower end of the internationally recommended range of reference levels in mind (see ICRP *Publication 103*); i.e. no action should be considered that would lead to exposures of the public larger than 1 mSv annual effective dose, which numerically also corresponds to the dose limit applied in planned exposure situations. Reference levels may be developed in the future that are more appropriate to the situation.

3.5.3 Exposures from accidents

ANSTO has assessed a variety of hypothetical external events and the impact that they could have upon the LFLS. Furthermore, ANSTO has calculated predicted doses that are expected to be incurred in the event that the level of radioactivity in the topsoil significantly increases. The doses calculated under these scenarios were very low.

3.5.4 Environment

Consistent with international best practice as outlined e.g. by the ICRP in its *Publication 108*, ANSTO has performed two screening-level dose assessments for biota affected by the LFLS. These were based upon two differing scenarios. The first scenario assumed that whilst the majority of the radioactivity was located within the trenches, some radioactivity had moved up to the surface soils.

The second scenario assumed that radioactivity had been transported off the site and into a local creek. ANSTO has conservatively assumed that amphibians and invertebrates are continuously exposed to a hypothetical concentration of radioactivity in the water and creek bed.

Broadly speaking, analysis of the inherently conservative scenarios indicates that the LFLS does not pose a radiological risk to species inhabiting the natural environment of concern, and that the facility is not going to compromise environmental protection objectives.

3.5.5 Conclusions

The protection of workers, the public and the environment under both normal and accident scenarios has been analysed. The ARPANSA reviewers concluded that sufficient information is provided and that the information provides evidence that the current state of LFLS, and its planned management, afford a high level of protection of the health of people and the environment. I agree with these conclusions.

With regard to whether the applicant has shown that the magnitude of individual doses, the number of people exposed, and the likelihood that exposure will happen, are as low as reasonably achievable, having regard to economic and social factors:

I consider enough evidence is before me regarding radiation doses to workers, the public and the environment to proceed with reaching a decision on the authorisation to *possess or control* a controlled facility.

3.6 Has the applicant shown capacity for complying with the regulations and the licence conditions that would be imposed under section 35 of the Act; whether the application has been signed by an office holder of the applicant, or a person authorised by an office holder of the applicant?

The capacity of ANSTO to comply with the Regulations and any licence conditions is assessed in the RAR to be satisfactory. ANSTO already hold several licences with ARPANSA and based on ARPANSA's experience from compliance monitoring I have no doubt ANSTO has the relevant capacity.

The application was signed by the CEO of ANSTO, Dr Adrian Paterson.

3.6.1 Conclusions

Whether the applicant has shown capacity for complying with these regulations and the licence conditions that would be imposed under section 35 of the Act; and whether the application has been signed by an office holder of the applicant, or a person authorised by an office holder of the applicant:

I consider that ANSTO, represented by the CEO for the purpose of this application, has the capacity of carrying out the conduct defined in the application in a manner that is compliant with the Regulations and with the licence conditions I may impose, to enable me to proceed with reaching a decision on authorisation to *possess or control* a controlled facility.

3.7 The content of submissions made by members of the public about the application

3.7.1 Process

The application to *possess or control* the LFLS was subject to the public consultation process required under regulation 40. In making a decision on the licence application, paragraph 41(3)(g) of the Regulations requires the CEO of ARPANSA to take into account any submissions received from the public about the application.

The public was advised of the application, and submissions were invited in the following ways:

- a. through a notice published in the Australian Government Gazette on 19 January 2015;
- b. through an advertisement in *The Australian* newspaper on 19 January 2015; and
- c. by posting information on the ARPANSA website from 19 January 2015;

Copies of the licence application submitted by ANSTO were made available to the public, along with advice as to how and when submissions could be made.

One submission from a member of the public was received. This is discussed in the RAR. The ARPANSA reviewer considered the content of the submission and concluded that it did not identify any issues which were not addressed by ANSTO in its application. I agree with this conclusion.

3.7.2 Conclusions

With regard to the content of submissions made by members of the public about the application:

I conclude that the public submission received in writing did not raise any fundamentally new or previously unknown issues in relation to the application for an authorisation to *possess or control* the LFLS.

4 General conclusions and licence conditions

4.1 General conclusions

For reasons recorded in this Statement of Reasons, I am satisfied that issuing a licence to *possess or control* the LFLS is an appropriate step in establishing plans for the final management of the waste and the facility. Such plans can be developed on the basis of IBP surrounding management of existing exposure situations such as legacy sites. In order to support the process of establishing a plan for final management of the waste and the facility, I attach conditions to the licence to *possess or control* the LFLS as outlined below.

4.2 Conditions of licence

Conditions of licence as specified in the Regulations apply and need not be re-stated here. Under section 35 of the Act I may impose licence conditions when I issue a licence. For this licence, I issue the following additional conditions:

Environmental Monitoring Programme

1. The licence holder must undertake an environmental monitoring programme approved by the CEO of ARPANSA.

Reporting

2. The licence holder must provide to the CEO of ARPANSA within twenty-eight (28) days of the end of each financial year, information about its compliance with the Act, the Regulations and Licence Conditions during the previous year. The annual report must also include:
 - A status update on the integrity of the facility trenches
 - Any change to the condition of the land surrounding the facility's trenches
 - Information collected through the environmental monitoring programme and the results of the data analysis

Planning

3. The licence holder must provide the CEO of ARPANSA with a plan for the medium and long term management of the Little Forest Legacy Site by 30 June 2018. This plan must include options for future disposition of the inventory of radioactive waste, including contingency plans to accommodate changes in Australia's national radioactive waste management policies.

5 Matters for ANSTO to consider

It has been established in this decision that ANSTO will provide plans detailing the future management of the LFLS in the medium and long terms by end of June 2018. Throughout this document I have stated my expectations for these plans. For convenience, these are summarised below:

It is expected that:

- a) ANSTO will utilise the 'safety case' concept as applicable in the future planning and decision making associated with the LFLS. It is anticipated that the safety case will evolve with time, until such time as a decision is taken on the final management of the wastes and the facility.
- b) Any proposed interventions at the site will be justified (i.e. the benefit will outweigh the detriment associated with the action).
- c) Any measures put forth by ANSTO will provide adequate consideration of the role of passive safety in achieving the safety objective.
- d) Further considerations of the medium and long term management of the waste and facility should take into account reference levels for public exposure; options leading to annual effective annual doses to members of the public above one 1 mSv should not be considered; however, the setting of appropriate reference levels will be a future consideration.