REPUBLIC OF CYPRUS

MINISTRY OF LABOUR, WELFARE AND SOCIAL INSURANCE

DEPARTMENT OF LABOUR INSPECTION

RADIATION INSPECTION AND CONTROL SERVICE

National Programme

on the responsible and safe management of radioactive waste in the Republic of Cyprus

(unofficial translation)

established and submitted to the European Commission under Articles 11, 12, 13 and 15 of the Council Directive 2011/70/Euratom of 19 July 2011 on the responsible and safe management of spent fuel and radioactive waste and Regulations 14, 15 and 16 of P.I. 178/2014 (the "Protection from Ionising Radiation and Nuclear Safety (Responsible and Safe Management of Spent Fuel and Radioactive Waste) Regulations of 2014")

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Abbreviations

(in alphabetical order)

DLI	Department of Labour Inspection
DSRS	Disused Sealed Radioactive Source
EC	European Commission
ENEF	European Nuclear Energy Forum
ENSREG	European Nuclear Safety Regulators Group
EU	European Union
Euratom	European Atomic Energy Community
EW	Exempt Waste
GICNT	Global Initiative for Combating Nuclear Terrorism
GSG	General Safety Guide
HERCA	Heads of European Radiological Protection Competent Authorities
HLW	High Level Waste
IAEA	International Atomic Energy Agency
ICAO	International Civil Aviation Organisation
ICRP	International Commission on Radiological Protection
IMDGC	International Maritime Dangerous Goods Code
ILW	Intermediate Level Waste
ITDB	Incident and Trafficking Database (of IAEA)
LLW	Low Level Waste
MLWSI	Minister of Labour, Welfare and Social Insurance
NORM	Naturally-Occurring Radioactive Material
P.I.	Public Instrument
RICS	Radiation Inspection and Control Service
TENORM	Technologically-Enhanced Naturally-Occurring Radioactive Material
TLC	Technical Licensing Committee
TSO	Technical Support Organisation
UNECE	United Nations Economic Commission for Europe
UPU	Universal Postal Union
VLLW	Very Low Level Waste
VSLW	Very Short Lived Waste

1 Introduction - Background - Purpose of the document

1.1 The Council Directive 2011/70/Euratom and its provisions – The National Programme

The Council Directive 2011/70/Euratom, establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste resulting from peaceful activities ("the Waste Directive") [Ref. 1], was adopted on 19 July 2011 and entered into force on 22 August 2011 (Official Journal of the European Union, L 199, p. 48-56).

The Directive establishes a Community framework for ensuring responsible and safe management of spent fuel and radioactive waste to avoid imposing undue burdens on future generations. The Directive aims at ensuring that Member States provide for the appropriate national arrangements for a high level of safety in spent fuel and radioactive waste management to protect workers and the general public against the dangers arising from ionising radiation. It also ensures the provision of necessary public information and participation in relation to spent fuel and radioactive waste management while having due regard to security and proprietary information issues.

The "Waste Directive" has been transposed to the national legislative framework in the form of special Regulations under the Protection from Ionising Radiation and Nuclear Safety legislation (P.I. 178/2014), as analysed below, and brought into force being published in the Official Gazette of the Republic on 4 April 2014 (Official Gazette of the Republic of Cyprus, Annex III, Part I – Public Instruments, Issue 4770, Publication No. 591, p. 591-597) [Ref. 2].

Obligations imposed on the Member States under this Directive refer, among others, to:

(a) the establishment and maintenance of national policies on spent fuel and radioactive waste management;

(b) the establishment and maintenance of a national legislative, regulatory and organisational framework for spent fuel and radioactive waste management;

(c) the establishment of a competent regulatory authority, which must be functionally separate from any other body or organisation concerned with the promotion or utilisation of nuclear energy or radioactive material (including electricity production and radioisotope applications) or with the management of spent fuel and radioactive waste, and effectively independent from undue influence on its regulatory function, and must have been given the legal powers and human and financial resources necessary to fulfill its obligations in connection with the above national framework;

(d) the requirements posed within the national framework to the license holders, ensuring that the prime responsibility for the safety of spent fuel and radioactive waste management facilities and/or activities rest with them and cannot be delegated;

(e) the requirement for arrangements for education and training and research and development activities to cover the needs of the National Programme for spent fuel and radioactive waste management;

(f) the obligation for availability of adequate financial resources for the implementation of National Programmes; and

(g) the obligation for transparency and provision of information on the management of spent fuel and radioactive waste to workers and the general public.

A key obligation under the Directive is that Member States shall ensure the establishment, maintenance and implementation of a National Programme, covering all aspects of spent fuel and radioactive waste management under their jurisdiction and at all stages of spent fuel and radioactive waste, from generation to disposal.

The National Programme serves as the key tool and basic reference for the respective national actors dealing with the practical implementation of national spent fuel and radioactive waste management policies, as well as sets out how the national Policy is transposed into practical solutions. In simple words, the National Programme gives an answer to what is the national spent fuel and radioactive waste inventory and what, how and when a Member State is going to do with it.

For each Member State, the infrastructure for the implementation of the National Programme is formed by its national legislative, regulatory and organisational framework. Thus, policy-making, the national framework and the National Programme are closely bound in a cohesive system.

Under the Directive, the National Programme shall be regularly reviewed and updated, taking into account technical and scientific progress, as appropriate, as well as recommendations, lessons learned and good practices from peer reviews.

The present National Programme includes all of the following items:

(a) the overall objectives of the national Policy of Cyprus in respect of radioactive waste management;

(b) the significant milestones and clear timeframes for the achievement of those milestones in light of the over-arching objectives of the National Programme;

(c) the inventory of all the radioactive waste and estimates for future quantities, including those from decommissioning, clearly indicating the location and amount of the radioactive waste in accordance with appropriate classification of the radioactive waste;

(d) the concepts or plans and technical solutions for the radioactive waste management from generation to disposal;

(e) the concepts or plans for the post-closure period of a disposal facility's lifetime, including the period during which appropriate controls are retained and the means to be employed to preserve knowledge of that facility in the longer term;

(f) the research and development activities that are needed in order to implement solutions for the management of spent fuel and radioactive waste;

(g) the responsibility for the implementation of the National Programme and the key performance indicators to monitor progress towards implementation;

(h) an assessment of the National Programme costs and the underlying basis and hypotheses for that assessment, which must include a profile over time;

(i) the financing scheme(s) in force;

(j) the transparency policy or process;

(k) the agreement(s), if any, concluded with other Member States or third countries on management of radioactive waste, including final disposal.

The European Commission (EC) shall be notified about the National Programme and any subsequent significant changes. According to the above mentioned Directive and the national Regulations (P.I. 178/2014), the National Programme of the Republic of Cyprus shall be submitted to the services of the EC for the first time by 23 August 2015.

The Republic of Cyprus, as well as all other Member States, shall also submit a report to the Commission on the implementation of the Directive for the first time by 23 August 2015, as well, and every 3 years thereafter, taking advantage of the review and reporting under the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management [Ref. 3a].

Finally, Member States shall periodically, and at least every 10 years, arrange for self-assessments of their national framework, competent regulatory authority, National Programme and its implementation, and invite international peer review of their national framework, competent regulatory authority and/or National Programme with the aim of ensuring that high

safety standards are achieved in the safe management of spent fuel and radioactive waste. The outcomes of any peer review shall be reported to the Commission and the other Member States, and may be made available to the public where there is no conflict with security and proprietary information.

1.2 The current situation in the Republic of Cyprus

A number of human activities results in the production of radioactive waste i.e. waste that contains materials emitting ionising radiation and posing a potential hazard to human health and the environment. Radioactive waste and spent fuel require containment and isolation from humans and the living environment over the long term. Its specific nature, namely that it contains radionuclides, requires measures to protect human health and the environment against dangers arising from exposure to ionising radiation, including safe disposal. The storage of radioactive waste, including long-term storage, is an interim solution, and not an alternative to final disposal.Therefore, the responsible and safe management of radioactive waste in a sustainable manner is essential for the protection of human health and the environment, at present and in the future.

Based on the existing radiation protection and nuclear safety legislation, which is described below:

(a) “radioactive waste” means radioactive material in gaseous, liquid or solid form for which no further use is foreseen or considered by the Republic or by a legal or natural person whose decision is accepted by the Republic, and which is regulated as radioactive waste by a competent regulatory authority under the legislative and regulatory framework of the Republic;

(b) “radioactive waste management” means all activities that relate to handling, pretreatment, treatment, conditioning, storage, or disposal of radioactive waste, excluding off-site transportation;

(c) “disposal” means the emplacement of spent fuel or radioactive waste in a facility without the intention of retrieval;

(d) “disposal facility” means any facility or installation the primary purpose of which is radioactive waste disposal;

(e) “license” means any legal document granted by the Competent Authority to carry out any activity related to the management of radioactive waste, or to confer responsibility for

siting, design, construction, commissioning, operation, decommissioning or closure of a radioactive waste management facility;

(f) “radioactive waste management facility” means any facility or installation the primary purpose of which is radioactive waste management;

(g) “storage” means the holding of spent fuel or of radioactive waste in a facility with the intention of retrieval;

(h) “license holder” means a legal or natural person having overall responsibility for any activity or facility related to the management of spent fuel or radioactive waste as specified in a license.

The Policy of the Republic of Cyprus on the management of radioactive waste is based on the implementation of a graded approach depending on the use of radioactive materials and the relevant practices in the country.

No nuclear applications that could lead to the generation or disposal of spent fuel (i.e. nuclear power plants, research reactors, nuclear treatment facilities, uranium or thorium mines etc.) exist in the country and the use of nuclear energy for the generation of electric power is not considered by the Government in the country’s energy mix in the foreseeable future; therefore, there is no immediate prospect of having nuclear materials or spent fuel and no present or planned activities related to nuclear materials or spent fuel.

The main origins of radioactive waste in the Republic of Cyprus are from activities in the field of medicine, industry, and research. All sources or other radioisotopes used in the Republic of Cyprus are produced abroad, mainly in the European Union (EU) and the United States. Radioactive waste may be produced in low volumes in solid or liquid form and may range from very low radioactivity levels to intermediate radioactivity levels, for example waste in medical laboratories for nuclear medicine applications.

All practices where radioactive materials are used, including practices with radioactive waste, have to be licensed under the Protection from Ionising Radiation and Nuclear Safety Laws of 2002 to 2011 [Ref. 4, 5 and 6]. For sealed sources, a condition imposed to the license holders is to return back to the supplier/manufacturer any disused source. Small amounts of short-lived radioactive waste produced in nuclear medicine departments in medical applications are kept until their activity is low enough to be disposed as normal waste. Also, any amount of radioactive waste produced in research activities that cannot be disposed of as normal waste, must be kept in storage until the activity is low enough to be disposed as normal waste or is exported/shipped abroad for final disposal.

In addition, all scrap metals exported/shipped to various countries for processing/recycling are monitored for radioactivity prior to shipment.

All disused sources, such as from cobalt-60 teletherapy units and other small sources from medical applications, lightning rods, smoke detectors, small sources for education purposes used in the past in secondary education schools etc. have been collected in a licensed temporary storage within the Lefkosia General Hospital, Ministry of Health (license holder) until a final solution is decided e.g. shipment abroad or final disposal in a facility in Cyprus.

The management of spent fuel in the country is prohibited by law (i.e. Regulation 5 of the Protection from Ionising Radiation and Nuclear Safety (Responsible and Safe Management of Spent Fuel and Radioactive Waste) Regulations of 2014 (P.I. 178/2014) [Ref. 2]). Also, no facilities that could treat, process, reprocess, condition etc. either spent fuel or radioactive waste exist in the country. Thus, the national Policy and Strategy refers only to the responsible and safe management of radioactive waste, and serves as the national commitment to address the country's waste issues in a coordinated, cooperative and sustainable manner, in line with the country's EU and other international obligations.

The Republic of Cyprus is a member of the EU since 2004 and a member of the International Atomic Energy Agency (IAEA) since 1965. The legislation in the Republic of Cyprus on the responsible and safe management of radioactive waste is in line with European Acquis and the IAEA standards.

The Republic of Cyprus acceded on the Joint Convention on the Safety of Spent Fuel Management and on the Safety of the Radioactive Waste Management [Ref. 3a] on 21 October 2009, with the enactment of the ratification Law 13(III)/2009, published in the Official Journal of the Republic of 24 July 2009, Issue 4120 [Ref. 3b]. The Convention has entered into force on 19 January 2010. Since its accession to the above Convention, the Republic of Cyprus participated in two Review Meetings of the Convention, in 2012 and in 2015, and submitted relevant national reports.

The administration of the legislation for the responsible and safe management of radioactive waste is assigned to the Minister of Labour, Welfare and Social Insurance (MLWSI) under the Protection from Ionising Radiation and Nuclear Safety Laws of 2002 to 2011 [Ref. 4, 5 and 6], acting through the Radiation Inspection and Control Service (RICS) of the Department of Labour Inspection (DLI). Furthermore, the Regulations on the Responsible and safe Management of Spent Fuel and Radioactive Waste of 2014 [Ref. 2] require that the Republic of Cyprus has in place a national framework for the management of radioactive waste and implements a national Policy and Strategy on this matter. This is also a requirement of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management [Ref. 3a] and other Conventions, in order to ensure the protection of the workers, the public and the environment from the radiological risks arising from the management of radioactive waste.

The radioactive waste classification scheme followed supports the arrangements for the responsible and safe management of radioactive waste, taking fully into account the specific types and properties of radioactive waste.

2 Overall principles and objectives of the national Policy and existing legislation

2.1 Main principles

2.1.1 Principles of radiation protection

The system of radiation protection in the Republic of Cyprus is based, as in all the EU Member States, on the Council Directive 96/29/Euratom [Ref. 7] laying down basic safety standards for the protection of the health of workers and the general public against the dangers from ionising radiation. This Directive incorporates the recommendations of the International Commission on Radiological Protection (ICRP) of 1990 (ICRP publication No. 60) [Ref. 8] and the basic safety standards of IAEA of 1996 [Ref. 9].

ICRP's most recent recommendations of 2007 (ICRP publication No. 103) [Ref. 10] and IAEA's basic safety standards of 2013 [Ref. 11] have been incorporated into EU legislation, through the Directive 2013/59/Euratom laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation [Ref. 12], which has to be transposed to the national legislation by 6 February 2018; however the basic principles of radiological protection remain unchanged.

The radiation protection principles applied are as following:

(a) Justification: in relation to a practice, any decision that alters the radiation exposure situation should do more good than harm;

(b) Optimisation of protection: the likelihood of incurring exposure, the number of people exposed, and the magnitude of their individual doses should all be kept as low as reasonably achievable, taking into account economic and societal factors;

(c) Dose limitation: the total dose to any individual from regulated sources in planned exposure situations other than medical exposure of patients should not exceed appropriate limits.

It should be noted that the justification principle relates to the practice giving rise to the waste, and not to subsequent waste management. However, both of the other two principles, optimisation of protection and dose limitation, do apply directly to the waste management.

2.1.2 Principles of the national Policy on the management of radioactive waste

The national Policy of the Republic of Cyprus on the management of radioactive waste is based on the following general principles:

(a) The national Policy on the responsible and safe management of radioactive waste serves as the national commitment to address the country's issues on the management of radioactive waste in a safe, secure, responsible and sustainable manner, in accordance with national objectives and recognised international principles to protect individuals, society and environment from the harmful effects of ionising radiation due to radioactive waste, and to avoid imposing undue burdens on future generations.

(b) The Policy is consistent with the requirements of the national legislative system, the obligations of the Republic of Cyprus as a member of the EU and the IAEA (Fundamental Safety Principles) [Ref. 13], relevant international principles and all international Conventions and Agreements to which the Republic of Cyprus is a party or signatory.

(c) The Policy drives the establishment of a coherent, comprehensive and integrated radioactive waste management system in the Republic of Cyprus, taking into account all types of radioactive waste generated in the country, at all stages of the radioactive waste management, from civilian applications of ionising radiation.

(d) The Government of the Republic of Cyprus has ultimate responsibility for the long-term management of radioactive waste.

(e) The financial burden for the management of radioactive waste, from generation to disposal, shall be borne, in principle, by the generators of the waste (the "Polluter pays" principle).

(f) The disposal of radioactive waste in dedicated facilities is recognised as the final end-point for sustainable management of radioactive waste, unless the waste can be released or exempted, according to national regulatory requirements.

(g) The interdependencies among all steps in radioactive waste generation and management are taken into account.

(h) Radioactive waste shall be safely managed, including in the long term with passive safety features.

(i) The minimisation of generation of radioactive waste at the design (minimisation at source), operation and decommissioning stages of facilities should be taken into account.

(j) The implementation of measures regarding the responsible and safe management of radioactive waste shall follow a graded approach.

(k) A sound evidence-based and documented decision-making process shall be applied with regard to all stages of the management of radioactive waste, based on scientific information, risk analysis and optimisation of resources.

The above-mentioned principles are strictly correlated with the objective of sustainable development, which meets the needs of today without compromising the ability of future generations to meet their own needs. In addition to the internationally accepted principles, radioactive waste management is implemented in accordance with the following principles:

(a) Transparency regarding all aspects of radioactive waste management: All radioactive waste management activities shall be conducted in an open and transparent manner and the public shall have access to information regarding waste management where this does not infringe on the security of radioactive material.

(b) The precautionary principle apply: Where there is uncertainty about the safety of an activity a conservative approach shall be adopted.

(c) Co-operative governance and efficient national co-ordination: waste management shall be managed in a manner that prevents duplication of effort and maximises coordination.

(d) International cooperation: The Government recognises that it shares a responsibility with other countries for global and regional radioactive waste management issues. Its actions shall follow the principles in the national Policy and in relevant regional and international agreements.

(e) Public Participation: Radioactive waste management shall take into account the interests and concerns of all interested and affected, when decisions are being made.

(f) Capacity building and education: The Government shall create opportunities to develop people's understanding, skills and general capacity concerning radioactive waste management.

(g) The Government will use these principles to develop, test and apply its Policy. The Government will also use the principles for decision-making, transparency, and, where necessary, amend laws and regulations.

2.1.3 Other principles

Further to the above, the following international principles apply:

(a) Protection of Human Health: Radioactive waste shall be managed in such a way as to secure an acceptable level of protection for human health.

(b) Protection of the Environment: Radioactive waste shall be managed in such a way as to provide an acceptable level of protection of the environment, including natural resources.

(c) Protection beyond National Borders: Radioactive waste shall be managed in such a way as to ensure that the possible effects on human health and the environment beyond national borders will be taken into account.

(d) Protection of Future Generations and Burden on Future Generations: Radioactive waste shall be managed in such a way that predicted impacts on the health of future generations will not be greater than relevant levels of impact that are acceptable today and that it will not impose undue burdens on future generations.

(e) National Legal Framework: Radioactive waste shall be managed within an appropriate national legal framework, including clear allocation of responsibilities and the provision for independent regulatory functions.

(f) Safety of Facilities: The safety of facilities for radioactive waste management shall be appropriately assured during each phase of the facility's lifecycle.

2.2 Legal and regulatory framework

One of the key statements of the national Policy on the responsible and safe management of radioactive waste is to establish and maintain the appropriate legislative and regulatory framework, ensuring the responsible and safe management of radioactive waste.

The national Policy mentioned above, the legal and regulatory framework described hereafter, and the National Programme are complementary elements, as shown in Figure 1: the national Policy implements internationally acceptable principles, the framework implements legislative, regulatory and organisational infrastructure, and the National Programme implements the Policy into practical solutions, from waste generation to disposal endpoints.

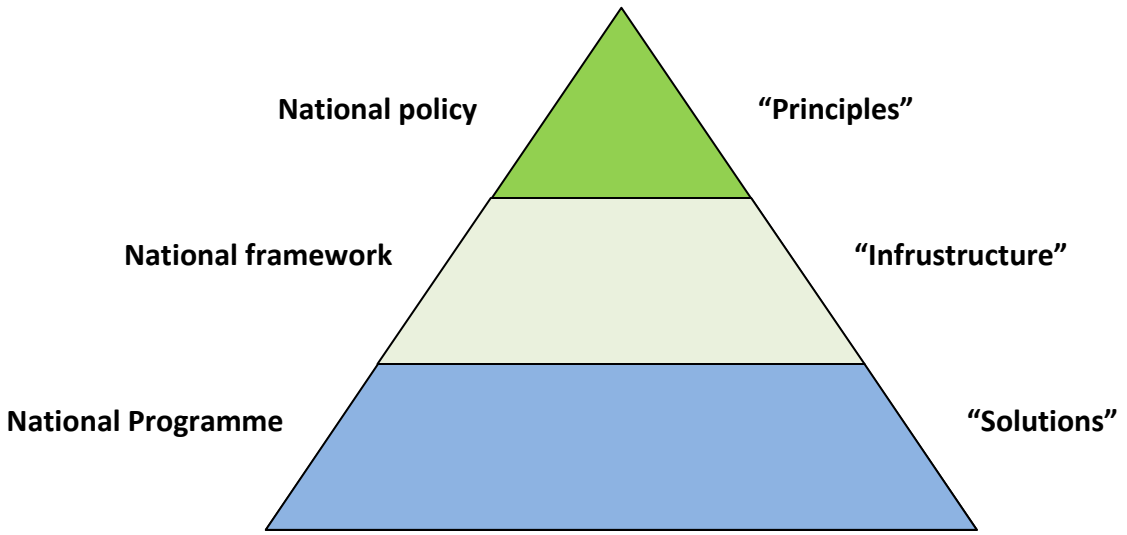

Figure 1. The national policy, the legal and regulatory framework and the National Programme are complementary elements (reproduced from the European Nuclear Energy Forum (ENEF) guidelines for the establishment and notification of National Programmes under the Council Directive 2011/70/Euratom).

2.2.1 Legal framework

The regulatory basis for radiation protection, nuclear safety (including nuclear security), and radioactive waste management is the Protection from Ionising Radiation and Nuclear Safety Laws of 2002 to 2011, which was enacted on 12 July 2002 (Law 115(I)/2002) [Ref. 4], and amended twice, in 2009 (Law 8(I)/2009) [Ref. 5] and in 2011 (Law 127(I)/2011) [Ref. 6], and various sets of Regulations issued under the Law, namely:

(a) The Protection from Ionising Radiation (Basic Principles) Regulations of 2002 (P.I. 494/2002) [Ref. 14];

(b) The Protection from Ionising Radiation (Informing the Public about Measures to be applied in Case of Emergency) Regulations of 2002 (P.I. 495/2002) [Ref. 15];

(c) The Protection from Ionising Radiation (Medical Exposure) Regulations of 2002 (P.I. 497/2002) [Ref. 16];

(d) The Protection from Ionising Radiation (Control of High-Activity Sealed Radioactive Sources and Orphan Sources) Regulations of 2006 (P.I. 30/2006) [Ref. 17];

(e) The Protection from Ionising Radiation (Supervision and Control of Shipments of Radioactive Waste and Spent Fuel) Regulations of 2009 (P.I. 86/2009) [Ref. 18]; and

(f) The Protection from Ionising Radiation and Nuclear Safety (Responsible and Safe Management of Spent Fuel and Radioactive Waste) Regulations of 2014 (P.I. 178/2014) [Ref. 2].

The above legislative framework is fully in line with the Euratom Acquis and the relevant international standards. The Euratom Treaty [Ref. 19] and all relevant EU regulations and decisions, conventions and other instruments ratified or signed by the EU apply directly. The above framework shall be revised by 2018, in order to be harmonised with the provisions of Directives 2013/59/Euratom (New BSS Directive) [Ref. 12], 2013/51/Euratom (Drinking Water Directive) [Ref. 20] and 2014/87/Euratom (Nuclear Safety amending Directive) [Ref. 21].

Furthermore, the Republic of Cyprus has ratified, signed or participates in a number of international conventions, protocols, agreements and other instruments in the field of radiation protection and nuclear safety, namely:

(a) The Conventions on Early Warning and Assistance in case of a Nuclear Accident, ratified with the Conventions on Early Warning and Assistance in the case of Nuclear Accident (Ratification) Law of 1988 (Law 164/1988) [Ref. 22];

(b) The Convention on Nuclear Safety, ratified with the Convention on Nuclear Safety (Ratification) Law of 1998 (Law 20(III)/1998) [Ref. 23];

(c) The Convention on Physical Protection of Nuclear Material and Nuclear Installations and its 2005 Amendment, ratified with the Convention on Physical Protection of Nuclear Material and Nuclear Installations (Ratification) Laws of 1998 and 2012 (Law 3(III)/1998 and Law 38(III)/2012) [Ref. 24];

(d) The Comprehensive Nuclear Test Ban Treaty, ratified with the Comprehensive Nuclear Test Ban Treaty (Ratification) Law of 2003 (Law 32(III)/2003) [Ref. 25];

(e) The Treaty on the Non-Proliferation of Nuclear Weapons, ratified with the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) (Ratification) Law of 1970 (Law 8/1970) [Ref. 26];

(f) The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management [Ref. 3a], ratified with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Ratification) Law of 2009 (Law 13(III)/2009) [Ref. 3b];

(g) The Safeguards Agreement between the Republic of Cyprus and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non–Proliferation of Nuclear Weapons, ratified with the Safeguards Agreement between the Republic of Cyprus and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (Ratification) Law of 1973 (Law 3/1973) [Ref. 27];

(h) The Protocol Additional to the Agreement between the Republic of Cyprus and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, ratified with the Protocol Additional to the Agreement between the Republic of Cyprus and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (Ratification) Law of 2002 (Law 27(III)/2002) [Ref. 28];

(i) The International Convention for the Suppression of Acts of Nuclear Terrorism, ratified with the International Convention for the Suppression of Acts of Nuclear Terrorism (Ratification) Law of 2007 (Law 44(III)/2007) [Ref. 29];

(j) The Agreement between the European Community of Atomic Energy, the Member States that do not possess nuclear weapons and the International Atomic Energy Agency, in application of Annexes 1 and 4 of Article III of the Treaty for the non Proliferation of Nuclear Weapons and its Additional Protocol, ratified with the Agreement between the European Community of Atomic Energy, the Member States that do not possess nuclear weapons and the International Atomic Energy Agency, in application of Annexes 1 and 4 of Article III of the Treaty for the non Proliferation of Nuclear Weapons and its Additional Protocol (Ratification) Law of 2007 (Law 37(III)/2007) [Ref. 30].

The Republic of Cyprus is also a member of IAEA, the Nuclear Suppliers Group and the Australian Group, and applies the relevant international standards for the transport of radioactive materials, namely:

(a) The IAEA Standards for Transport of Radioactive Materials [Ref. 31];

(b) The United Nations Recommendations on the Transport of Dangerous Goods [Ref. 32];

(c) The International Maritime Dangerous Goods Code (IMDGC) [Ref. 33];

(d) The International Civil Aviation Organisation (ICAO) Technical Instructions on the Safe Transport of Dangerous Goods [Ref. 34]; and

(e) The Universal Postal Union (UPU) Convention [Ref. 35].

The above legislation applies to both for natural or artificial sources of radiation and covers all aspects related to the use of ionising radiation and nuclear safety, such as:

(a) Occupational exposure, including outside workers;

(b) Public exposure;

(c) Medical exposure;

(d) Control of High-Activity Sealed Radioactive Sources and Orphan Sources;

(e) Supervision and Control of Shipments of Radioactive Waste and Spent Fuel;

(f) Responsible and safe management of radioactive waste; and

(g) Emergency preparedness and response.

The above legislation provides, inter alia, for:

(a) The establishment of the regulatory authority for radiation protection and nuclear safety;

(b) Justification, optimisation of protection and dose limitation for all practices;

(c) The notification and licensing of practices and sources in relation to custody, use, manufacture, supply, handling, distribution, storage, import, export, disposal, recycling, commissioning, decommissioning etc.;

(d) The establishment of a Technical Licensing Committee (TLC), which advises the MLWSI of Labour, Welfare and Social Insurance on licensing matters and approves/suggests the conditions of licenses;

(e) Appeals;

(f) Obligations of employers or license holders;

(g) Appointment and powers of the chief inspector and of inspectors;

(h) Enforcement actions and penalties;

(i) The design, erection, commissioning, and decommissioning of nuclear installations;

(j) The storage, shipment, and disposal of radioactive waste, spent fuel or disused sources;

(k) The categorisation of workplaces and workers;

(l) Individual monitoring and area monitoring;

(m) Health surveillance of workers;

(n) Environmental radioactivity monitoring;

(o) Disposal of radioactive waste and discharges;

(p) Radiological or nuclear emergency preparedness and response;

(q) Transport or shipment of radioactive materials; and

(r) The power of the Council of Ministers to issue Regulations under the Law.

The process of establishing and revising legislation in the Republic of Cyprus is as following:

(a) Drafting of the legislation by the regulatory authority;

(b) Consultation with all stakeholders/interested parties and the public;

(c) Legal vetting by the Legal Service of the Republic (Attorney General Office);

(d) Approval of draft legislation or regulations by the Council of Ministers;

(e) Examination of the draft legislation in the respective Committee of the House of Representatives (Parliament);

(f) Approval by the House of Representatives;

(g) In the case of a set of Regulations, issuance by the Council of Ministers; and

(h) Publication in the Official Gazette of the Republic (entering into force).

2.2.2 Regulatory framework

2.2.2.1 The system of authorisation (notification, registration and licensing)

The existing legislation provides that no person shall:

(a) use in any manner, handle, possess, produce, store, convey, cause to be conveyed, supply, transport, import, export, recycle, reuse or dispose any radioactive substance or radioactive waste,
(b) manufacture, use, store, import, export, recycle, reuse or dispose any irradiating apparatus,
(c) erect, construct, use, dismantle, or demolish any nuclear installation, or any premises,
(d) carry out any activity or practice involving radioactive substances,
(e) carry out any activity or practice involving irradiating apparatuses,
(f) deliberately add radioactive substances during the production and manufacture of medicinal products and import or export such goods,
(g) deliberately add radioactive substances during the production and manufacture of consumer goods and import or export such goods,
(h) deliberately administer radioactive substances to persons and, in so far as radiation protection of human beings is concerned, animals for the purpose of medical or veterinary diagnosis, treatment or research,
(i) use X-ray equipment or radioactive sources for industrial radiography or for processing of products, or for research, or for the exposure of persons for medical treatment, and use accelerators, except electronic microscopes,
(j) exploit or close down uranium mines,

unless,

(a) he has a license, granted to him by the MLWSI, after applying in writing;
(b) the activity concentration and the total activity of the radioactive substance are below the clearance levels prescribed and the applicant has submitted in writing to the MLWSI a risk assessment which concludes that the risk of health detriment associated with the practice in question, will not exceed the prescribed dose limits for the safeguarding of health protection of persons against risks from exposure to ionising radiation, or of the protection of use of property or of the environment;
(c) the irradiating apparatus is not capable of producing radiation dose rates in excess of 1 µSv/h at a distance of 0,1 m from any accessible surface of the apparatus or not containing components operating at a potential more than 5 kV.

The provisions of paragraphs (b) and (c) above shall not apply in any case where a person has applied for a license to erect, construct, use, decommission or demolish a nuclear installation.

The license is granted on conditions, including the condition that the supplier/manufacturer shall accept the responsibility to receive back the source for disposal at the end of its useful life.

The granting of a license shall constitute a necessary pre-condition for the granting of a building or town planning permit, but such document shall not bind the Competent Authority in the exercise of its authority.

The conditions shall be specified as the case may be and shall refer, among others, to:

(a) the quantitative assessment of risks associated with the practice,
(b) the control of radioactive substances,
(c) the installation and maintenance of efficient systems for the detection, measurement and recording of the presence and intensity of ionising radiation of any type, emitted from anything on the premises, or by anything that is conveyed, carried away or discharged,
(d) the design, location, construction, installation, operation, modification and maintenance of any premises or equipment containing radioactive substances, or any irradiating apparatus or any nuclear installations,
(e) the preparations for dealing with, and the measures to be taken on the occurrence of a radiological accident or a radiological emergency, and
(f) the handling, processing, transport, storage and disposal of radioactive materials and irradiating apparatuses.

The licensee/end-user can be different from the importer/distributor of the source/device. The licensee has the obligation of operating, servicing and calibrating the device according to the instructions of the manufacturer (including leak test frequency for the device) and of carrying out his activities in compliance with the provisions of the legislation and the general principles for protection against ionising radiation in his premises/installations. These activities (measurement, guidance, information, training, etc.) shall be performed only by qualified persons (“Qualified Experts”), and if these persons are not available internally in the undertaking, then shall be hired from the private sector.

The appropriate application form shall be used for applying for a license. The applicant shall submit to RICS/DLI his application together with all relevant technical information (source official certificate, source type, serial number, source manufacturer, source supplier/distributor, end user, purpose of use etc.), at least 30 days prior to commencing the practice. This requirement also applies in the case of devices/equipment with embedded sources. If the MLWSI is of the opinion that the information submitted is not enough/satisfactory for making a decision, he may require by writing to the applicant, further information specified in his letter.

The applications are examined by the regulatory authority, which after inspection(s) of the premises/installations and practices for which the application has been submitted, drafts the conditions of the license. With the exception of the cases where a license is granted for transport, import or export of sources or generators, the application and the conditions of the

license are processed by the TLC, which advices accordingly the MLWSI, in order to set up, change or make a decision regarding the conditions of the license. The TLC comprises of representatives and/or technical advisors from five ministries, while representatives of district administrations, municipalities or other local authorities may participate as observers. The TLC is chaired by the representative of the Ministry of Labour, Welfare and Social Insurance.

The above procedure is also followed in the case when radioactive waste is produced from any type of practice, e.g. depositions of radioactive material in pipes, containers etc., or release of radioisotopes in the air. Only those DSRS for which no further use is foreseen or considered in the Republic of Cyprus are ultimately declared as radioactive waste.

In case of performing external activities using radioactive sources, e.g. in industrial radiography practices, RICS/DLI shall be informed in writing prior to commencing these activities about the programme that will be followed.

A license shall be granted only to natural or legal persons and shall not be transferable to other persons.

The MLWSI may grant licenses, based on general conditions which have already been approved by the TLC.

Respective fees apply for processing the application and granting the license. The licensing procedure for the submission of the application for a license and the information required shall be specified in a notification of the MLWSI published in the Official Gazette of the Republic and is normally completed in no more than 30 days from receipt of the complete application and all necessary documentation. The period for which a license is granted may vary according to the type of practice(s) for which is granted.

Moreover, the technical support organisations (TSO's), such as the Quilified Experts (experts in radiation protection and nuclear safety), dosimetry services, radiation protection and nuclear safety training experts, radioactivity monitoring laboratories etc. need to be approved by the regulatory authority, after applying in writing.

Finally, this legislation is implemented following a graded approach and it allocates responsibilities and provides for coordination between relevant bodies.

2.2.2.2 Exemptions from the requirement of reporting or applying for a license

According to the Law, no reporting or licensing is required:

(1) for practices involving:

(i) radioactive substances, where the quantities do not exceed in total the values set out in the Law, or

(ii) radioactive substances, where the activity concentrations per unit mass do not exceed the values set out in the Law;

(iii) apparatuses containing radioactive substances exceeding the quantities or concentration values specified in paragraphs (i) or (ii), provided that:

- they are of an approved type specified in a notification of the MLWSI published in the Official Gazette of the Republic, and
- they are constructed in the form of a sealed source, and
- they do not cause, in normal operating conditions dose rates exceeding 1 μSv/h at a distance of 0,1 m from any accessible surface of the apparatus, and
- the conditions for disposal have been specified by the MLWSI,

or

(iv) the operation of any electrical apparatus to which this Law applies, other than that referred to in paragraph (v), provided that:

- it is of an approved type specified in a notification of the MLWSI published in the Official Gazette of the Republic, and
- it does not cause, in normal operating conditions, dose rates exceeding 1 μSv/h at a distance of 0,1 m from any accessible surface of the apparatus, or

(v) the operation of a cathode ray tube intended for the display of visual images, or other electrical apparatus operating at a potential difference not exceeding 30 kV, provided that this operation does not cause, in normal operating conditions, dose rates exceeding 1 μSv/h at a distance of 0,1 m from any accessible surface of the apparatus, or

(vi) material contaminated with radioactive substances resulting from authorised clearances which the Inspection Service has declared not to be subject to further controls.

(2) for the disposal, recycling or reuse of radioactive substances or materials provided they comply with limits approved by the MLWSI, following advice of the TLC, and published in the Official Gazette of the Republic, and which follow basic criteria set in the Law.

(3) for any practice, specified in a notification of the MLWSI published in the Official Gazette of the Republic, for which criteria set in the Law are met.

2.2.2.3 Inspection and assessment

As explained in more detail below, the MLWSI, acting through RICS/DLI, is the regulatory authority in the Republic of Cyprus for radiation protection and nuclear safety and has the responsibility for the administration of the relevant legislation. In this framework, the MLWSI may appoint a Chief Inspector and Inspectors, as well as any other persons he may deem appropriate, for the enforcement of the Law.

An Inspector or the Chief Inspector appointed under the Law, is empowered to enter freely and without prior notice any premise, except domestic premises, for which he has reason to believe it is necessary for him to enter, at any reasonable time, or is in a situation which in his opinion may cause imminent risk of serious health detriment, serious degradation of the environment, or serious loss of use of property.

An Inspector or the Chief Inspector is empowered to perform actions, such as, among others:

(a) to carry out tests, investigations, inspections and surveys;
(b) to require the production of any register, notice, document etc. necessary for the purposes of any inspection, test, formal investigation or survey;
(c) to require any person to answer relevant questions;
(d) to require any person in the place of work to fascilitate and assist him;
(e) to take measurements or photographs and make such recordings;
(f) to take and remove samples of any items or substances; etc.

A graded approach is followed in the implementation of the provisions of legislation for inspection and assessment.

2.2.2.4 Notices - Offences and penalties - Revocation or surrender of a license

If an Inspector is of the opinion that a person is contravening any provision of this law, or of any regulations made under the Law, he may serve him a notice, referred to as an “improvement notice”, requiring that person to remedy the contravention, or, as the case may be, the matters causing it, within a stated period of time.

If an Inspector is of the opinion that any premises or installation, or plant, or equipment, or place of work, or any practice or other activity carried on in the premises or installation or place of work or which is about to be carried on therein involves serious risk of health detriment, or serious loss of use of property or serious degradation of the quality of the environment arising from radiation, or as the case may be, it is expected to involve serious risk of health detriment, or serious loss of use of property, or serious degradation of the quality of the environment arising out of radiation, he may serve on the licensee or on the employer, or his representatives or on the person who is responsible for the premises, installation equipment or place of work, or for the activities carried on therein, a notice referred to as a “prohibition notice”, prohibiting forthwith the use of that premises, or installation, or equipment, or place of work, or the carrying out of practices or other activities, until the risk involved is eliminated to the Inspector’s satisfaction.

The MLWSI may amend the conditions of a license granted to a license holder at any time he deems appropriate, by adding new or amending existing conditions or by revoking or cancelling the license. Whenever a license has been revoked or surrendered, the MLWSI may give to the licensee such directions in writing as he may deem necessary, for preventing any harm from

ionising radiation or from anything which is being done or has been done or was present at the premises in question.

Subject to the above, a license may be revoked at any time by the MLWSI. If a license has been revoked or surrendered, the licensee shall, if so directed by the MLWSI, deliver or transfer the responsibility of such license to another person, as the MLWSI may direct. During the remainder of the period of responsibility of such license, the licensee shall display or cause to be kept displayed, on the premises, and in such positions as the MLWSI may require, notices indicating the limitations thereof.

Any person who fails to comply with any obligation imposed on him under this law or regulations issued under this law, shall be guilty of an offence and shall be liable to a fine not exceeding thirty-four thousand euro or to imprisonment not exceeding two years or to both such penalties.

The Law provides for offences and penalties for persons who contravene a court order, or a condition of a license or document issued under this law, or a condition specified by the Authority, or approval under this law, or any obligation or prohibition imposed with an improvement or prohibition notice.

The Law also provides for offences and penalties for persons who intentionally obstruct or delay an Inspector in the exercise of his powers, or prevent any other person from appearing to an Inspector or answering any question to which an Inspector may require an answer, or to their knowledge or intentionally make a false statement etc.

2.2.2.5 Establishment of the regulatory authority

The MLWSI, acting through RICS/DLI, is the regulatory authority in the Republic of Cyprus for radiation protection and nuclear safety and has the responsibility for the administration of the relevant legislation and authorisation of all sources and practices involving risks of exposure to ionising radiation.

RICS was established in 2002 within the DLI, in the framework of the implementation of the Radiation Protection and Nuclear Safety Laws of 2002 to 2011, aiming at the protection of individuals and the environment against risks arising from ionising radiation during the use of sources or exposure and from risks due to dispersion of radioactive substances or radioactive contamination, including the protection against the dangers arising from ionising radiation from nuclear installations.

The regulatory authority is functionally separate from any other body or organisation involved in the promotion or use of nuclear energy and ionising radiation in general, and is effectively independent from undue influence in its regulatory decision making.

Based on the above legislation, the regulatory authority has the necessary legal powers and human and financial resources to fulfill its obligations under the national legislative framework. RICS carries out licensing, inspections and enforcement activities, which are financed through the annual budget of the DLI.

RICS/DLI is currently staffed with one senior labour inspection officer and four labour inspection officers, with science or engineering background and training and experience in radiation protection and nuclear safety matters.

2.2.2.6 Status of the regulatory authority

RICS/DLI performs, among other things, the following functions:

(a) recommends safety and health standards for practices which may cause health detriment arising from exposure to ionising radiation or may cause harm to the environment or may give rise to loss of use of property due to dispersion of radioactive substances, or due to radioactive contamination;

(b) inspects, for the purposes of compliance with the legislation in force, any practices or installations in which activities are carried out that may cause a health detriment arising from exposure to ionising radiation or may cause harm to the environment or may give rise to loss of use of property due to dispersion of radioactive substances, or due to radioactive contamination;

(c) coordinates or ensures the presence of educational, scientific or other type of organisations for the purpose of providing of instructions for, or the education or training of apprenticeship or of other relevant services in respect of protection against risks from ionising radiation;

(d) coordinates or ensures, in collaboration with other Services when necessary, that a national system and plans for the prevention of or response to radiological accidents and radiological emergencies are established;

(e) keeps appropriate registers, including inventories of sources of ionising radiation, of premises, of practices and of the exposed workers and the doses received;

(f) recommends the establishment of a national framework for nuclear safety and its improvement when appropriate, taking into account operating experience, insights gained from safety analyses fir operating nuclear installations, development of technology and results of safety research, when available and relevant; and

(g) monitors the levels of radioactivity in the air, soil, water, sea, foodstuff, feedings stuff, building materials and other products and goods, and ensures the application of appropriate measures, where appropriate.

Moreover, the regulatory authority ensures the implementation of the National Programme for the management of radioactive waste, covering all types of radioactive waste under its jurisdiction and all stages of the radioactive waste management, from generation to disposal. The regulatory authority shall regularly review and update its National Programme, taking into account technical and scientific progress, as appropriate, as well as recommendations, lessons learned and good practices from peer reviews.

As mentioned above, with the exception of the cases where a license is granted for transport, import or export of sources or generators, the MLWSI is advised by the TLC, in order to prepare, change or make a decision regarding the conditions of the license.

The regulatory authority is cooperating with and is supported in its duties by other institutions and laboratories, with capabilities in radioactivity analysis, measurement and dosimetry, namely:

(a) the Environmental and Food Radioactivity Laboratory of the State General Laboratory (SGL), established under the Ministry of Health, for laboratory environmental analysis and measurements;

(b) the Secondary Standard Dosimetry Laboratory of the Nicosia General Hospital, Ministry of Health; and

(c) other laboratories for analytical spectroscopic measurements.

The above laboratories have upgraded their monitoring capabilities with the procurement of new equipment, increasing manpower, training of their personnel, participating in inter-comparison exercises etc. Moreover, the Environmental and Food Radioactivity Laboratory of the SGL has been recently accredited with ISO 17025.

If necessary, the regulatory authority may request assistance from institutions in other countries, the EU, the IAEA and other international organisations. A bilateral agreement with the Greek Atomic Energy Commission is in place, which covers all issues concerning the applications of ionising radiation and nuclear safety.

Appropriate arrangements have also been made for combating illicit trafficking and terrorism. In this context, customs and police officers involved have been trained in these matters and appropriate detection equipment has been installed/procured and is in use in the major commercial ports and airports of the Republic of Cyprus. In addition, the Republic of Cyprus

participates in all initiatives of the United Nations, the IAEA, the EU and the Global Initiative for Combating Nuclear Terrorism (GICNT).

Moreover, a comprehensive environmental radioactivity monitoring network is operated by the regulatory authority and is connected to the EURDEP platform. The automated ambient gamma dose rate monitoring network also acts as the early warning system in the country.

A fully operational emergency preparedness and response system in case of radiological or nuclear emergencies is in place. The national emergency preparedness and response action plan has been recently reviewed and updated.

The regulatory authority acts as the national contact point for IAEA, including the Incident and Trafficking Databank (ITDB), Euratom, and other relevant organisations and is the competent authority for various international conventions. It participates in various EU or international initiatives, including European Nuclear Safety Regulators Group (ENSREG) and the Heads of European Radiological Protection Competent Authorities (HERCA).

The national framework is maintained and improved, when necessary, taking into account operating experience, insights gained from safety analyses of operating installations involving the use of ionising radiation, any developments of technology and results of safety research.

2.3 Responsibilities for the implementation of the National Programme and organisations involved

2.3.1 Allocation of responsibilities

The national Policy provides for the allocation of responsibilities related to the management of radioactive waste:

(a) The MLWSI has been assigned the responsibility as the competent authority for the implementation of the legislation on the management of radioactive waste, and under this legislation, RICS/DLI, which carries out licensing, control, inspection, and enforcement activities, has been established.

(b) The competent authority shall be functionally separate from any other body/organisation linked with the promotion or use of nuclear energy or other radioactive materials or with the management of radioactive waste, in order to ensure effective independence from undue influence on its regulatory function. It is understood that the utilisation of radioactive sources by a competent regulatory authority for the purpose of carrying out its regulatory tasks does not affect its independence.

(c) The MLWSI is responsible for policy-making and establishing and implementing the legal framework, ensuring cooperative governance, ensuring a nationally-coordinated graded approach to the management of radioactive waste, fulfilling national obligations in terms of international agreements where applicable, reviewing and updating the national Policy and Strategy for the Responsible and safe Management of Radioactive Waste, ensuring compliance with this Policy, and ensuring implementation of the Strategy.

(d) The generators of radioactive waste have the primary responsibility for the safe management of the waste they generate and that responsibility cannot be delegated. Under specific circumstances, this responsibility lies with the license holders to whom the responsibility has been entrusted/allocated by the competent authority. The waste generators/operators shall be responsible for the technical, financial, and administrative management of radioactive waste within the national regulatory framework and within any applicable government arrangements, and for the development and ongoing review of their own specific radioactive waste management system.

(e) The Government has the ultimate responsibility for the long-term management of radioactive waste.

(f) The Government will take responsibility for the management of radioactive waste where the generator no longer exists (ownerless radioactive waste) and for the provision of control over closed disposal facilities and the funding thereof, where applicable.

(g) Where radioactive waste is shipped for processing or reprocessing from the Republic to a Member State or a third country, the ultimate responsibility for the responsible and safe disposal of those materials, including any waste as a by-product, remains with the Republic.

The national strategy provides for the allocation of responsibilities for strategy development and implementation:

(a) MLWSI is responsible for the long-term strategic planning.

(b) RICS/DLI manages the national inventory of the existing radioactive waste in the country. The inventory should be kept up to date and appropriate records should be maintained.

(c) RICS/DLI adopts the waste categorisation scheme in use, based on the end-point solution(s) identified for radioactive waste, and according to the IAEA General Safety Guide No. GSG-1 “Classification of radioactive waste”, IAEA, Vienna, 2009 [Ref. 36].

(d) Services for the collection, characterisation, transport, and processing of all radioactive waste generated in the Republic of Cyprus are to be contracted on an ad-hoc basis and performed under the control of RICS.

(e) RICS reports to the Government on an annual basis concerning the activities performed in the reporting period, the amounts and types of radioactive waste that have been managed and on any other relevant issues.

(f) If any other governmental or privately-owned bodies are involved in any way in management of radioactive waste, this should be done in a co-operative manner and be responsible to enforce compliance with legal requirements and advising the Government as appropriate.

2.3.2 Responsibilities of the license holders

The prime responsibility for radiation protection and nuclear safety within his premises or installations, including the safety radioactive waste management facilities and/or activities, rests with the license holder, and this responsibility cannot be delegated.

A license holder is responsible for carrying out his activities ensuring primarily the safety and security of the sources or irradiators under his control, according to the conditions of the license, applying the basic principles of radiation protection, and taking all appropriate measures to protect workers, patients, members of the public, properties and the environment from risks arising from the use of ionising radiation. A license holder is obliged under the law to regularly assess, verify and continuously improve, as far as reasonably achievable, the safety of the radioactive waste management facility or activity in a systematic and verifiable manner. This shall be achieved through an appropriate safety assessment, other arguments and evidence.

As part of the licensing process of a facility or activity, the safety demonstration shall cover the development and operation of an activity and the development, operation and decommissioning of a facility or closure of a disposal facility as well as the post-closure phase of a disposal facility. The extent of the safety demonstration shall be commensurate with the complexity of the operation and the magnitude of the hazards associated with the radioactive waste and spent fuel, and the facility or activity. The licensing process shall contribute to safety in the facility or activity during normal operating conditions, anticipated operational occurrences and design basis accidents. It shall provide the required assurance of safety in the facility or activity. Measures shall be in place to prevent accidents and mitigate the consequences of accidents, including verification of physical barriers and the license holder's administrative protection procedures that would have to fail before workers and the general public would be significantly affected by ionising radiation. That approach shall identify and reduce uncertainties.

The existing legislation on radiation protection and nuclear safety also provides that a license holder shall take all necessary technical and administrative measures, in relation to the license granted to him, for securing safety and health of any individual and for protecting the use or property of any person and the environment and shall establish and implement integrated management systems, including quality assurance, which give due priority for overall management of radioactive waste to safety and are regularly verified by the competent regulatory authority. The licensee may appoint other persons to carry out actions or to carry out tasks related to his obligations as a licensee, but the licensee shall retain the responsibility for such actions, tasks or omissions himself and has the overall responsibility for the radiation protection and nuclear safety. A licensee shall notify in writing RICS of his intention to introduce modifications to any practice or source for which he is licensed, and whenever the modifications will have significant implications on safety and health matters, on the protection of use of property of any person and on the protection of the environment, he shall not carry out any modification unless he has a new license for this purpose.

Moreover, a licensee shall establish an appropriate management and administrative system, commensurate with the size of the undertaking or practice licensed, and a quality assurance programme, as appropriate. Risk assessment and an assessment of the effectiveness of protective measures applied by the licensees, in relation to sources of ionising radiation, shall be made at different stages, including the decision for locating, design, manufacture, construction assembly, commissioning, operation, maintenance, decommissioning or demolition, as appropriate. A licensee shall ensure that all personnel who has responsibility for protection from ionising radiation is appropriately trained and qualified so that they understand their responsibilities and perform their duties with judgement and according to the specified procedures.

Finally, license holders are required to provide for and maintain adequate financial and human resources to fulfil their obligations with respect to the safety of radioactive waste management.

The regulatory authority carries out inspections in order to verify compliance with the existing legislation.

Complementary to the above, the national strategy provides for the compliance of licensees with requirements/obligations/principles:

(a) The licensees shall adopt measures for preventing or, where this is not achievable, minimising as reasonably achievable the quantity of radioactive waste generated by their activities, both in terms of activity and volume, by means of appropriate design measures and of operating and decommissioning practices. The licensees shall explore the possibility of reusing or recycling the whole or part of the radioactive waste they produce. The minimisation of the effects of disposals on environment and members of the public shall be one of the main priorities of licensees;

(b) The licensees shall apply the principles of justification, optimisation, and dose limitation, and take all appropriate measures, as necessary, to protect workers, patients, the public, property and the environment from risks arising from the use of ionising radiation, including activities leading to the generation and management of radioactive waste;

(c) The licensees shall regularly assess, verify and continuously improve to the reasonably achievable extent the safety of the radioactive waste management facility in a systematic and verifiable manner;

(d) The licensees shall establish and implement integrated management systems, including quality assurance, in order to give due priority to the safety of the overall radioactive waste management scheme; and

(e) The licensees shall have measures in place to prevent accidents and mitigate the consequences of accidents, including verification of physical barriers and the license holder's administrative protection procedures that would have to fail before workers and the general public would be significantly affected by ionising radiation.

2.4 Transparency policy and public involvement processes

The Protection from Ionising Radiation and Nuclear Safety Laws of 2002 to 2011 [Ref. 4, 5 and 6] require that information in relation to radiation protection and nuclear safety is made available to the workers and the general public. The procedure for the adoption of new legislation involves consultation with all stakeholders and the public. Information is made available to the public in accordance with national legislation and international obligations.

The Regulations on the Responsible and Safe Management of Spent Fuel and Radioactive Waste [Ref. 2] provide that the necessary information on the management of spent fuel and radioactive waste shall be made available to workers and the general public. This obligation includes ensuring that the competent regulatory authority informs the public in the fields of its competence. Information shall be made available to the public in accordance with national legislation and international obligations, provided that this does not jeopardise other interests such as, inter alia, security, recognised in national legislation or international obligations.

These Regulations [Ref. 2] also provide that the public is given the necessary opportunities to participate effectively in the decision-making process regarding spent fuel and radioactive waste management in accordance with national legislation and international obligations. Specifically, Regulation 13 provides that the competent authority may inform the public, by a notification published in the Gazette, in two newspapers of wide circulation in the Republic and on the internet, about a forthcoming decision, the nature of possible decisions or, where such decision

has already been made, the draft decision; the place and time in which the information associated with the impending decision are available to the public; and that any member of the public may submit to the competent authority views or raise an issue within 35 days from the date of publication of the notice. In addition, the competent authority, informs the public, by notice published in two newspapers of wide circulation in the Republic and on the internet, of the views received or issues raised by any person. Before taking a decision, the competent authority shall take in due account the views received or issues raised. The way in which the competent authority has taken into account the received views or raised issues shall be included in a summary statement, which is maintained in an appropriate record, as provided for in the legislation.

Furthermore, the national Policy on the management of radioactive waste provides the following:

(a) Transparency and information to the public:

i. All radioactive waste management activities shall be conducted in an open and transparent manner, in compliance with current legislation and international obligations, and the public will be granted access to information regarding waste management, where this does not infringe upon national laws, security and defence.

ii. The license holders shall ensure that necessary information on the management of radioactive waste is made available to workers and the general public.

(b) Decision-making and public participation:

i. An evidence-based and documented decision-making process shall be applied with regard to all stages of the management of radioactive waste.

ii. The documentation of the decision-making process as it relates to safety should be commensurate with the levels of risk (graded approach) and should provide a basis for decisions related to the management of spent fuel and radioactive waste. This should enable the identification of areas of uncertainty on which attention needs to be focused in an assessment of safety. Safety decisions should be based on the findings of an assessment of safety and information on the robustness and reliability of that assessment and the assumptions made therein.

iii. Decision-making shall be based on proven scientific information and recommendations of the national Competent Authority (i.e. the MLWSI). Radioactive waste management shall take into account the interests and

concerns of all interested and affected parties, when decisions are being made. The Competent Authority shall ensure that the public is given the necessary opportunities to participate effectively in the decision-making process regarding waste management.

iv. Where there is uncertainty about the safety of an activity, a conservative approach shall be adopted.

Moreover, the Republic of Cyprus is a contracting party to the United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, known as the "Aarhus Convention". This Convention establishes a number of rights of the public, individuals and their associations, with regard to the environment, such as the right of everyone to receive environmental information that is held by public authorities ("access to environmental information"), the right to participate in environmental decision-making ("public participation in environmental decision-making"), and the right to review procedures to challenge public decisions that have been made without respecting the two aforementioned rights or environmental law in general ("access to justice").

2.5 Agreements with other countries

Currently, no agreement in the field of management of radioactive waste exists with other countries.

As mentioned above, if necessary, the regulatory authority may request assistance from institutions in other countries, the EU, the IAEA and other international organisations. A bilateral agreement with the Greek Atomic Energy Commission is in place, which covers all issues concerning the applications of ionising radiation and nuclear safety.

In the case of DSRS, for which the regulatory authority approves the import of sealed radioactive sources only on the condition that the sources are accepted back by the supplier/manufacturer at the end of their useful life (repatriation of DSRS), the endpoint is the return to the receiving country and responsible organisation/company in that country. In such cases, there are in place arrangements/ agreements between the licensee in the Republic of Cyprus and the manufacturer or the supplier abroad, whatever applicable, for accepting back such sources.

2.6 Waste classification system

A national radioactive waste classification scheme has been adopted and supports the arrangements on the management of radioactive waste, taking fully into account the specific types and properties of radioactive waste.

Consistent with internationally acceptable practice, “radioactive waste” for legal and regulatory purposes may be defined as material that contains or is contaminated with radionuclides at concentrations or activities greater than clearance levels as established by the regulatory authority, and for which no use is foreseen. It should be recognised that this definition is purely for regulatory purposes, and that material with activity concentrations equal to or less than clearance levels is radioactive from a physical viewpoint, although the associated radiological hazards are negligible.

Radioactive material which could satisfy requirements for clearance, reuse, reprocessing or recycling is considered as potential radioactive waste, for example contaminated metal.
Ownerless radioactive waste is radioactive waste where the generator no longer exists or cannot be identified through reasonable means or does not have the resources to manage such waste.

In the Chapter “Definition and classification scheme of radioactive waste”, the national Policy on the management of radioactive waste provides for the following:

For the purposes of implementing this Policy and establishing a national strategy for radioactive waste management, the Republic of Cyprus currently follows the guidelines of IAEA regarding the definition and classification of radioactive waste, as described in the General Safety Guide No. GSG-1 “Classification of radioactive waste”, IAEA, Vienna, 2009 [Ref. 36], and shown in Figure 2.

(a) Exempt waste (EW): Waste that meets the criteria for clearance, exemption or exclusion from regulatory control for radiation protection purposes as described in IAEA Safety Standards Series No. RS-G-1.7 “Application of the Concepts of Exclusion, Exemption and Clearance”, IAEA, Vienna, 2004.

(b) Very short lived waste (VSLW): Waste that can be stored for decay over a limited period of up to a few years and subsequently cleared from regulatory control according to arrangements approved by the regulatory body, for uncontrolled disposal, use or discharge. This class includes waste containing primarily radionuclides with very short half-lives often used for research and medical purposes.

(c) Very low level waste (VLLW): Waste that does not necessarily meet the criteria of EW, but that does not need a high level of containment and isolation and, therefore, is suitable for disposal in near surface landfill type facilities with limited regulatory control. Such landfill type facilities may also contain other hazardous waste. Typical waste in this class includes soil and rubble with low levels of activity concentration. Concentrations of longer lived radionuclides in VLLW are generally very limited.

(d) Low level waste (LLW): Waste that is above clearance levels, but with limited amounts of long lived radionuclides. Such waste requires robust isolation and containment for periods of up to a few hundred years and is suitable for disposal in engineered near surface facilities. This class covers a very broad range of waste. LLW may include short lived radionuclides at higher levels of activity concentration, and also long lived radionuclides, but only at relatively low levels of activity concentration.

(e) Intermediate level waste (ILW): Waste that, because of its content, particularly of long lived radionuclides, requires a greater degree of containment and isolation than that provided by near surface disposal. However, ILW needs no provision, or only limited provision, for heat dissipation during its storage and disposal. ILW may contain long lived radionuclides, in particular, alpha emitting radionuclides that will not decay to a level of activity concentration acceptable for near surface disposal during the time for which institutional controls can be relied upon. Therefore, waste in this class requires disposal at greater depths, of the order of tens of meters to a few hundred meters.

(f) High level waste (HLW): Waste with levels of activity concentration high enough to generate significant quantities of heat by the radioactive decay process or waste with large amounts of long lived radionuclides that need to be considered in the design of a disposal facility for such waste. Disposal in deep, stable geological formations usually several hundred meters or more below the surface is the generally recognised option for disposal of HLW.

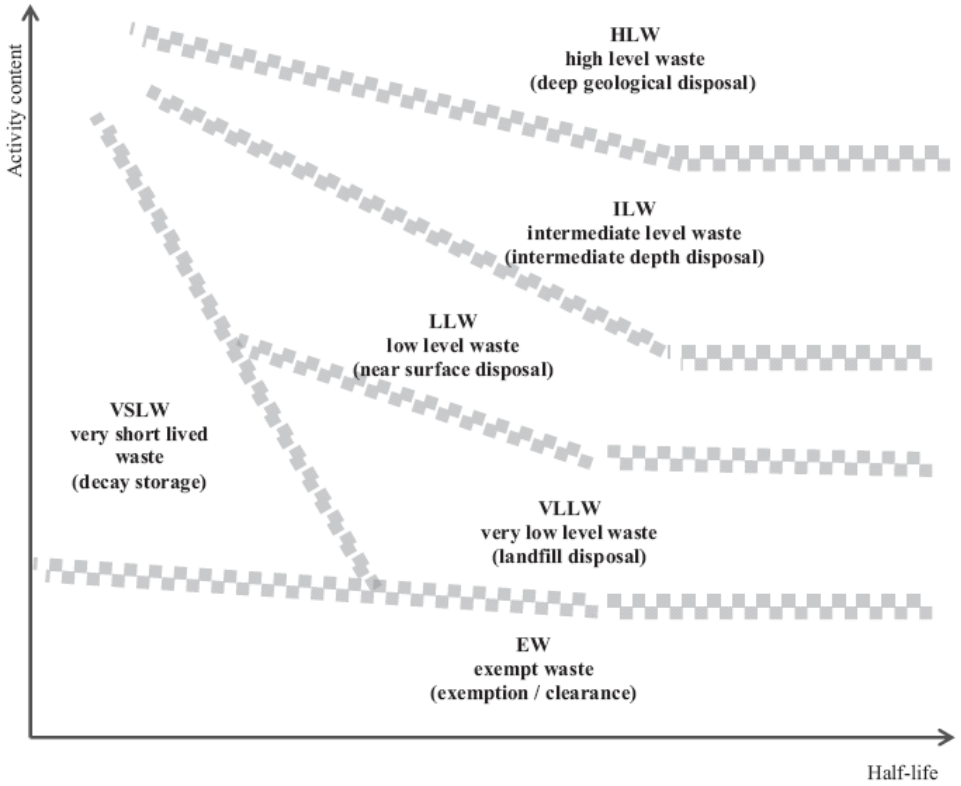

Figure 2. Conceptual illustration of the waste classification scheme (Source: General Safety Guide No. GSG-1 "Classification of radioactive waste", IAEA, Vienna, 2009) [Ref. 36].

2.7 Inventory of radioactive waste and estimation of future arisings, including supporting assumptions for future estimations

Directive 2011/70/Euratom defines that the National Programmes for the responsible and safe management of spent fuel and radioactive waste shall include an inventory of all spent fuel and radioactive waste and estimates for future quantities, including those from decommissioning, clearly indicating the location and amount of the radioactive waste and spent fuel in accordance with appropriate classification of the radioactive waste.

RICS/DLI manages the national inventory of the existing radioactive waste in the country. The inventory is documented in a systematic manner, taking into account the characteristics and the location of the waste, kept up to date and appropriate records are maintained. The national inventory is structured based on the particular needs in the Republic of Cyprus, and is transformed into different waste streams, where all radioactive waste is brought under different management routes. The management routes cover the steps from generation of the waste, via different treatments, if applicable, towards their respective endpoints.

The full national inventory of radioactive waste, as well as estimates for future quantities of radioactive quantities, is attached as Annex.

The national inventory is exhaustive and provides a sufficiently broad set of information for radioactive waste, such as:

(a) The radionuclide content;
(b) The amount, composition, chemical and physical form, as well as possible chemical, physical, and other risks;
(c) The location;
(d) The origin and history, including previous and present “owners”;
(e) Plans and time schedules for returning waste to an owner in a different country;
(f) Estimations of future arisings; and
(g) Classification in accordance with management and disposal routes within the National Programme.

It is estimated that current quantities/volumes of radioactive waste will not change significantly in the medium and long-term future:

(a) As described elsewhere in this document, small volumes of short-lived radioactive waste from medical or research applications is stored for decay until its activity is low enough to be disposed as normal waste. Medical centres in Cyprus use about 6 TBq of Tc-99m and 3 TBq of I-131 per year. Other isotopes such as In-111, I-125, Ga-67, and Th-201 are also used in medical centres and specialised laboratories but both their volumes and activity concentrations are very small (a few GBq per year in total). Nearly all of these enter the sewage system, as liquid waste. Due to the nature of these radioisotopes (short half-life), and/or the very small quantities used, there is no need to segregate them from regular waste. The import, usage and release of these isotopes are licensed and the regulatory authority is informed at each step.

(b) DSRS for which further use is foreseen are not considered as radioactive waste and the regulatory authority requires that licensees shall have in place repatriation agreements for DSRS with manufacturers/suppliers in other countries and the endpoint is the responsible organisation/company in the receiving country. Moreover, the possibility of contracting the re-use of these DSRS to suppliers/manufacturers abroad that manufacture small sources for educational or research purposes shall be explored. Finally, the possibility of discovering orphan sources or other contaminated materials in metal scrap yards, due to the isolation of the country by land from other countries, is not considered as high. It is however possible that the number of lightning rods and smoke detectors disposed of to increase in future due to renovation works taking place in buildings and replacement with other similar equipment of modern technology.

3 Radioactive waste management

As mentioned elsewhere, no nuclear applications that could lead to the generation of spent fuel (i.e. nuclear power plants, research reactors, nuclear treatment facilities, uranium or thorium mines etc.) exist in the country and the use of nuclear energy for the generation of electric power is not considered by the Government in the country's energy mix in the foreseeable future; therefore, there is no immediate prospect of having spent fuel and no present or planned activities related to spent fuel.

The main origins of radioactive waste in the Republic of Cyprus are from activities in the fields of medicine, industry, and research. All sources or other radioisotopes used in the Republic of Cyprus are produced abroad, mainly in the EU and the US. Radioactive waste may occur mainly in low volumes in solid or liquid form that may range from very low radioactivity levels, for example waste in medical laboratories for nuclear medicine applications, to intermediate radioactivity levels, such as DSRS used for cancer therapy in the past.

3.1 Existing management methods implemented internationally and used as reference

All practices where radioactive materials are used, including practices with radioactive waste, have to be licensed under the Protection from Ionising Radiation and Nuclear Safety Laws of 2002 to 2011 [Ref. 4, 5 and 6]. For sealed sources, a condition imposed to the license holders is to return back to the supplier/manufacturer any disused source. Small amounts of short-lived radioactive waste produced in nuclear medicine departments in medical applications are kept until their activity is low enough to be disposed as normal waste. Also, any amount of radioactive waste produced in research activities that cannot be disposed of as normal waste, must be kept in storage until the activity is low enough to be disposed as normal waste or is exported/shipped abroad for final disposal.

In addition, all scrap metals exported/shipped to various countries for processing/recycling are monitored for radioactivity prior to shipment.

All disused sources, such as from cobalt-60 teletherapy units and oher small sources from medical applications, lightening rods, smoke detectors, small sources for education purposed used in the past in secondary education schools etc. have been collected in a licensed temporary storage facility until a final solution is decided e.g. shipment abroad for final disposal or construction of a local licensed disposal facility.

The management of spent fuel in the country is prohibited by law (i.e. Regulation 5 of the Protection from Ionising Radiation and Nuclear Safety (Responsible and Safe Management of

Spent Fuel and Radioactive Waste) Regulations of 2014 (P.I. 178/2014)) [Ref. 2]. Also, no facilities that could treat, process, reprocess, condition etc. either spent fuel or radioactive waste exist in the country.

3.2 Existing and planned RW management according to existing or planned waste streams from generation to disposal routes

3.2.1 Existing technical solutions up to disposal (according to the national waste classification) – Waste management routes

Radioactive waste and materials that are potential radioactive waste are continuously generated during the execution of regulated activities. Radioactive waste may also exist due to previous activities, historic processing of radioactive materials or even due to illegal activities e.g. illicit trafficking.

The following principles apply for the existing technical solutions for the management of radioactive waste:

(a) the generation of radioactive waste is kept to the minimum which is reasonably practicable, both in terms of activity and volume;

(b) the selection of suitable waste management options should be verified;

(c) the interdependencies between all steps in radioactive waste generation and management are taken into account;

(d) radioactive waste is safely managed, including in the long term with passive safety features;

(e) implementation of measures follows a graded approach;

(f) the costs for the management of radioactive waste is borne by those who generated those materials; and

(g) an evidence-based and documented decision-making process is applied with regard to all stages of the management of spent fuel and radioactive waste.

The disposal of radioactive waste is allowed only for radioactive waste generated within the territory of the Republic of Cyprus and is accomplished in an authorised facility. Radioactive waste generated in the Republic may not be disposed off within its territory, if at the time of shipment an agreement has entered into force between the Republic and another Member State or a third country to use a disposal facility in one of them.

The Republic, or an authorised undertaking in the Republic, maintains the right to return radioactive waste after processing to the country of origin where:

(a) the radioactive waste is to be shipped to the Republic or undertaking for processing; or

(b) other material is to be shipped to the Republic or undertaking with the purpose of recovering the radioactive waste.

The regulatory authority approves the import of sealed radioactive sources only on the condition that they are accepted back by the supplier/manufacturer at the end of their useful life (repatriation of DSRS).

DSRS are not considered as radioactive waste. Only those DSRS for which no further use is foreseen or considered in the Republic of Cyprus are ultimately considered as radioactive waste.

(a) DSRS for repatriation

DSRS under repatriation or to be repatriated are under regulatory control from their arrival in the Republic till shipment to the manufacturer/supplier. Where take-back agreements are in place between licensees in the Republic and manufacturers/suppliers in other member states or third countries abroad, the endpoint is the return to the receiving country and responsible organisation/company in that country.

(b) DSRS for disposal

DSRS that cannot be repatriated/exported are stored at the territory of the Republic of Cyprus until they can be disposed of at a national or multinational facility. Preferable option is a centralised storage of such sources. Currently, all DSRS, such as cobalt teletherapy units and small sources from medical applications, lightning rods, americium smoke detectors, education sources etc. are stored in a licensed temporary storage unit until a final solution is decided by the Government.

(c) Radioactive waste from medical or research nuclear applications (hospitals, laboratories, etc.)

Whenever appropriate, short-lived radioactive waste originating from medical or research applications (e.g. hospitals conducting nuclear medicine practices or research laboratories) is stored for decay until its activity is low enough to be disposed as normal waste, otherwise to be exported/shipped abroad.

Decay storage is an acceptable method by which some radioactive wastes, in some circumstances, are best managed, at least as an interim step to final disposal. Decay storage is

not acceptable if the sole purpose of the storage is to defer waste management costs to the future.

A license holder (i.e. waste generator) is obliged to make an initial assessment on whether decay storage is the most appropriate method for the type of waste he produces and the decay storage needs to be licensed by the regulatory authority as part of the licensee's waste management plan. A number of factors need to be taken into account, including operators´ dose, the security of storage facilities, the length of time required in order to meet the desired reduction in activity etc. For situations where the waste is exempt, no regulatory submission is required.

Other radioactive waste from this type of facilities will be treated and conditioned for disposal, accordingly. Up to now, there was no case of export/shipment abroad of short-lived radioactive waste originating from medical or research applications.

(d) Orphan sources/contaminated material

A system exists for the control of orphan sources and other radioactively-contaminated material. These sources or materials will be managed and disposed of, accordingly. Currently, as explained above, all DSRS, lightning rods, smoke detectors, education sources etc. are stored in a licensed temporary storage unit until a final solution is decided by the Government.

(e) NORM/TENORM

Naturally-Occurring Radioactive Materials (NORM) or Technologically-Enhanced Naturally-Occurring Radioactive Materials (TENORM) was produced in the past due to the activities of a now decommissioned fertiliser plant at Vasilikos area in the southern coast of Cyprus. Part of it, as well as DSRS and solid waste from decommissioning were sent abroad for treatment and proper disposal, while the rest part is kept at the site of its generation, properly stabilised and covered with plastic liner and soil, and is under the supervision and monitoring of RICS. Future governmental plans to construct a natural gas liquidification terminal and the energy center of the country in the area, and also any future plans to conduct activities that could lead to the NORM production or treatment, such as NORM originating from the newly-developed hydrocarbons exploration and exploitation industry, should be also taken into consideration.

3.2.2 Solutions to be developed up to disposal and post closure (according to the national waste classification)

(a) DSRS for repatriation

The regulatory authority will continue requiring that the licensees establish and have in place take-back agreements for DSRS between them and manufacturers/suppliers in other countries and the endpoint is the responsible organisation/company in the receiving country.

(b) DSRS for disposal

Currently, all DSRS from past activities (legacy sources) are stored in a licensed temporary storage; however a final disposal solution such as a centralised disposal facility shall be considered by the Government (point 3.2.2(e) below). Moreover, the possibility of contracting the re-use of these DSRS to suppliers/manufacturers abroad that manufacture small sources for educational or research purposes shall be explored.

(c) Radioactive waste from medical or research nuclear applications (hospitals, laboratories, etc.)

Radioactive waste from medical or research applications other than short-lived radioactive waste, that cannot be stored for decay until its activity is low enough to be disposed as normal waste, will be exported/shipped abroad, otherwise to be treated and conditioned for disposal, accordingly (point 3.2.2(e) below).

(d) Orphan sources/contaminated material

This radioactive waste will be managed and disposed of, accordingly. A final disposal solution such as a centralised disposal facility shall be considered by the Government (point 3.2.2(e) below).

(e) Disposal facility

Taking into consideration that by applying consistently the “take-back” principle of any new source imported/shipped to the Republic of Cyprus to the supplier or the manufacturer does not lead to the production of any new significant quantities of radioactive waste, as well as that currently no scrap metal recycling industries exist in the country where potential DSRS could result in the contamination of large bulk amounts of recycled metal, then the type, nature and size of legacy waste present in the Republic does not give reason to consider an urgent solution for waste management in the country i.e. constructing a large off-site radioactive waste disposal facility.

However, the Government may consider in a medium to long-term horizon the following solutions:

(a) A long-term above ground off-site storage facility or a near surface repository, licensed for this purpose

The advantage of this option is that if more appropriate technologies are developed in future, then the waste can be dealt with using those technologies. Nevertheless, all

measures shall be taken to secure that storing above ground would not result in an undue burden on future generations.

(b) Near-surface geological disposal

In terms of meeting most of the waste policy principles, this method is currently the most internationally acceptable option mainly for high level waste and spent fuel management and, as such, will require very careful consideration by the Government. If chosen as a preferred option in the Republic, geological disposal of radioactive waste shall take place with an option for retrieving the waste. This option does not foreclose on the possibility of future technology advancements but the fact of providing better management options should be considered when making a decision.

Solutions such as reprocessing, conditioning and recycling are not to be taken into consideration, as they will require dedicated specialised facilities and the cost and sustainability/effectiveness implications of building such facilities could not be compromised, based on the type and amount of waste produced in the Republic. On the other hand, the Republic shall consider that reprocessing facilities are available in foreign countries and the option of sending the Republic's legacy or any other new waste for reprocessing, conditioning and recycling shall be seriously investigated and weighted with other options available.

In case of constructing a centalised storage facility, waste acceptance criteria, i.e. quantitative or qualitative criteria specified by the regulatory authority, or specified by an operator and approved by the regulatory authority, for radioactive waste to be accepted by the operator of a disposal facility, or by the operator of a storage facility, shall be defined.

These waste acceptance criteria shall be based on the results of safety assessment of the disposal/storage system, with regard to the site characteristics, peculiarities of the disposal/storage facility design and characteristics of radioactive waste form, container/ package, container content and radionuclide composition, etc.

The technical solutions and waste management routes analysed in par. 3.2.1 and 3.2.2 above, as presented under the Joint Convention [Ref. 3a], are summarised in Table 1.

Table 1. Technical solutions and waste or DSRS management routes in the Republic of Cyprus.

Type of Liability	Long-term management policy	Funding of Liabilities	Current practices/ facilities	Planned activities/ facilities
Spent Fuel	N/A	N/A	N/A	N/A
Nuclear Fuel Cycle Waste (NPPs)	N/A	N/A	N/A	N/A

Application Waste	Decay; Disposal; Export/Shipment	Licensee	Decay (Interim storage and retention of short-lived waste); Interim storage	None
Decommissioning	DSRS repatriated	Licensee	Two plants and a hospital decommissioned in the past	
Disused Sealed Radioactive Sources (DSRS)	Return to supplier or manufacturer; Repatriation and local final disposal of legacy DSRS considered	Licensee; State budget	Interim storage; Return to supplier or manufacturer; Repatriation and local final disposal of legacy DSRS considered	Disposal options for legacy DSRS under consideration
NORM and Non Nuclear Fuel Cycle Mining Waste	N/A	N/A	N/A	N/A

3.2.3 Time schedules - significant milestones and time frames

Milestones and timeframes for the achievement of these milestones represent realistic and achievable interim targets, linked to the completion of an important element of the programme, and form an integral part of the each management step of an individual or group of waste streams. Milestones and timeframes are defined for tasks relevant for several or all streams, as applicable.

Timeframes for some important milestones are placed in a medium term basis, as these milestones and timeframes might be strongly influenced by or dependent on socio-political processes and possibly also by scientific-technical and geological findings.

Table 2 presents the main milestones and timeframes for implementing the content of the National Programme, based on the relevant existing legislation, international obligations and the national Policy and Strategy on the management of radioactive waste.

Table 2. Main milestones and timeframes.

No.	Milestone	Responsibility	Timeframe
1	**National Policy and Strategy/Inventory**		
1a	Develop strategic and annual plans regarding radioactive waste management and submit them for governmental approval.	RICS/DLI, MLWSI	On a continuous basis
1b	Maintain and update the inventory of radioactive waste in the country.	RICS/DLI, MLWSI	On a continuous basis
1c	Revise the national framework on radiation protection, including the management of spent	RICS/DLI, MLWSI	By 6 February 2018

No.	Milestone	Responsibility	Timeframe
	fuel and radioactive waste, if necessary, based on the Directive 2013/59/Euratom.		
1d	Arrangement for a self-assessment of the national legislative and regulatory framework, the National Programme and its implementation, and invitation of an international peer review.	RICS/DLI, MLWSI	By 2016, and at least every 10 years thereafter
2	**Reporting**		
2a	Reporting to the Government on an annual basis concerning the activities performed in the period of the report, the amounts and types of radioactive waste that have been managed and on any other relevant issues.	RICS/DLI, MLWSI	On a annual basis
2b	Reporting to the EC of the National Programme and any subsequent significant changes.	RICS/DLI, MLWSI	By 23 August 2015
2c	Reporting to the EC on the implementation of the Directive 2011/70/Euratom, taking advantage of the review and reporting under the Joint Convention.	RICS/DLI, MLWSI	For the first time by 23 August 2015, and every 3 years thereafter
2d	Reporting of the outcomes of the peer review to the EC and other Member States. The report will be also made available to the public where there is no conflict with security and proprietary information.	RICS/DLI, MLWSI	As soon as it becomes available, based on 1d
3	**Infrastructure**		
3a	Assess the need for safety/security-upgrade of the existing DSRS storage.	RICS/DLI, MLWSI, Ministry of Health	Short-term
3b	Assess the options for conditioning/processing of existing radioactive waste/DSRS and the need for special equipment.	RICS/DLI, MLWSI	Short-term
3c	Initiate the process for identifying, selecting and proposing appropriate end-points.	RICS/DLI, MLWSI	Short-term
3d	Take a decision on the establishment of a centralised radioactive waste management facility (for storage and/or disposal) and assign responsibilities accordingly.	Proposal by RICS/DLI, MLWSI, decision by the Government.	Short- to medium-term
3e	Authorisation of such a centralised radioactive waste management facility (for storage and/or disposal).	RICS/DLI, MLWSI	Short- to medium-term
3f	Approval of a waste management organisation(s), if needed.	RICS/DLI, MLWSI	Short- to medium-term
3g	Inspection and enforcement.	RICS/DLI, MLWSI	On a continuous basis
3h	Public involvement in decision-making.	---	On a continuous

No.	Milestone	Responsibility	Timeframe
			basis
4	**Radioactive waste routes/inventory**		
4a	Consider the adjustment of the existing classification system based on the end-point solutions identified for radioactive waste.	RICS/DLI, MLWSI	Short-term, and on a continuous basis thereafter
4b	Assess legacy DSRS disposal options, based on the quantification and characterisation of legacy waste.	RICS/DLI, MLWSI, in consultation with other governmental departments.	Short-term
4c	Identify requirements for each radioactive waste management step and decide on their implementation.	RICS/DLI, MLWSI, in consultation with radioactive waste generators.	Short-term
5	**Resources**		
5a	Strengthen the capabilities of the governmental departments involved, mainly of RICS/DLI (increase in the number of staff involved and through training).	The Government, based on RICS/DLI proposal.	Short-term
5b	Assess the resources needed, in particular the cost for each management step, including disposal.	RICS/DLI, MLWSI	Short-term
5c	Consider specifying fees for radioactive waste management services.	RICS/DLI, MLWSI	Short-term
5d	Assess the resources needed, if safety/security-upgrade of existing DSRS storage is considered.	RICS/DLI, MLWSI	Short-term
5e	Assess the resources needed, if conditioning/processing of radioactive waste/DSRS is considered.	RICS/DLI, MLWSI	Short-term

As the National Programme for the radioactive waste management covers a long time period, major milestones might need in a future revision/update of the National Programme to be complemented by additional ones in order to cover the required level of detail with its timely proximity.

4 Research and Development (R&D) plans and activities

Plans and activities for continuing R&D, aiming at improving waste characterisation, reduction of waste generation and overall safety, improved disposal implementation etc, shall be based on the experience and operational feedback and make use of competence networks and platforms, reviews and international developments.

As explained above, the type, nature and size of legacy waste present in the Republic does not give reason to consider an urgent solution for waste management in the country i.e. constructing an off-site radioactive waste disposal facility. The regulatory authority requires consistently the application of the "take-back" principle of any new source imported/shipped to the Republic of Cyprus to the supplier or the manufacturer does not lead to the production of any new significant quantities of radioactive waste. Also, currently, no scrap metal recycling industries exist in the country where potential DSRS could result in the contamination of large bulk amounts of recycled metal.

The Government may consider, for completing its plans and activities for continuing R&D, in a medium to long-term horizon the following solutions:

(a) A long-term above ground off-site storage facility or a near surface repository, licensed for this purpose; The advantage of this option is that if more appropriate technologies are developed in future, then the waste can be dealt with using those technologies. Nevertheless, all measures shall be taken to secure that this storing would not result in an undue burden on future generations.

(b) Near-surface geological disposal; In terms of meeting most of the waste policy principles, this method is currently the most internationally acceptable option for the radioactive waste in Cyprus and, as such, will require very careful consideration by the Government. If chosen as a preferred option in the Republic, geological disposal of radioactive waste shall take place with an option for retrieving the waste. This option does not foreclose on the possibility of future technology advancements but the fact of providing better management options should be considered when making a decision.

Solutions such as reprocessing, conditioning and recycling are not to be taken into consideration, as they will require dedicated specialised facilities and the cost and effectiveness implications of building such facilities could not be compromised, based on the type and amount of waste produced in the Republic. On the other hand, the Republic shall consider that reprocessing facilities are available in foreign countries and the option of sending the Republic's legacy or any other new waste for reprocessing, conditioning and recycling shall be seriously investigated and weighted with other options available.

In case of constructing a centalised storage or disposal facility, waste acceptance criteria, i.e. quantitative or qualitative criteria specified by the regulatory authority, or specified by an operator and approved by the regulatory authority, for radioactive waste to be accepted by the operator of a disposal facility, or by the operator of a storage facility, shall be defined.

These waste acceptance criteria shall be based on the results of safety assessment of the disposal/storage system, with regard to the site characteristics, peculiarities of the disposal/storage facility design and characteristics of radioactive waste form, container/ package, container content and radionuclide composition, etc.

In any case, once the needs have been identified, R&D plans and activities can be fulfilled by:

(a) Research at a national level, especially necessary for implementation of specific disposal projects in the Republic;

(b) Joint R&D activities on a bilateral and/or multinational level, making effective use of resources and providing access to existing knowledge, including EU framework programmes contributing to geological disposal and advanced fuel cycle options;

(c) Contracting/acquisition of R&D, especially where advanced and experienced programmes can provide the knowledge in a more effective way.

All steps of the radioactive waste management activities and individual waste streams shall be covered.

5 Economical and financial issues

5.1 Assessment of costs

Cost assessment provides the basis for the selection and application of the appropriate financing scheme and for the calculation of adequate and timely accrual of the required financial resources. The ultimate goal is the coverage of short and long-term liabilities related to radioactive waste management, including management of legacies and the post-closure phase of disposal facilities.

Once a decision is made by the Government on final waste management solutions, the cost assessment performed should cover relevant investments, financing costs, operational costs, post-closure costs, regulatory control, maintenance, R&D, development of competences and skills, public involvement, etc.

5.2 Financing schemes, needs and estimations

The national and Community legislation provides that the national framework shall require that adequate financial resources be available when needed for the implementation of national programmes and that the license holders shall provide for and maintain adequate financial and human resources to fulfill their obligations with respect to the safety of radioactive waste management.

The generators of radioactive waste have the primary responsibility for the safe management of the waste they generate and that responsibility cannot be delegated. Under specific circumstances, this responsibility lies with the license holders to whom the responsibility has been entrusted/allocated by the competent authority.

The waste generators/operators are responsible for the technical, financial, and administrative management of radioactive waste within the national regulatory framework and within any applicable government arrangements, and for the development and ongoing review of their own specific radioactive waste management system. Thus, the generators of radioactive waste shall bear all the costs of radioactive waste management from the production to disposal of such waste, including the cost of monitoring of such waste or waste storages (or in future, repositories after their closure) and the cost of the required research and development. The export/shipment (or in future, processing, conditioning or treatment) of radioactive waste for disposal is paid for by the generator in the form of direct payments to the supplier/manufacturer of the sources or specialist organisations which carry out such activities, whatever applicable.

Moreover, the national Policy and Strategy on the management of radioactive waste allocated responsibilities regarding the availability of resources, as following:

(a) The Government shall ensure in due time the availability of financial, technical and human resources to maintain the sustainability of the radioactive waste management system in the country and to implement the radioactive waste management strategy as planned, including the availability of human and financial resources necessary for the competent authority to fulfill its obligations in connection with the national radioactive waste management framework;

(b) Taking into due account their responsibility, radioactive waste generators shall also ensure that adequate financial and human resources are available when needed to fulfill their obligations with respect to the safety of radioactive waste management and for the implementation of the National radioactive waste management Programme.

As regards the ownerless radioactive waste, the Government will take responsibility for the management of radioactive waste where the generator no longer exists (ownerless radioactive waste) and for the provision of control over closed disposal facilities and the funding thereof, where applicable.

Where radioactive waste is shipped for processing or reprocessing from the Republic to a Member State or a third country, the ultimate responsibility for the responsible and safe disposal of those materials, including any waste as a by-product, remains with the Republic.

Also, the Government shall, in a short-term interval, based on the decisions that will be made for the establishment of centralised disposal facility, consider the establishment a radioactive waste management fund. In keeping with the “polluter pays” principle, the contributors to the fund will be the generators of radioactive waste. The contributions shall, amongst others, be based on the classification of the waste, as well as on the volumes. The purpose of the fund shall be to ensure that there are sufficient provisions for the long-term management options of the various waste forms. These shall include fees for disposal activities, provisions for decommissioning and decontamination, research and development activities including investigations into waste management options, capacity building initiatives for radioactive waste management, and fees for other activities related to radioactive waste management. The way of the management of the fund shall be determined by Government. Each of the generators shall enter into an agreement with the fund, while the Government shall contribute accordingly to the fund for the management of radioactive waste from governmental institutions.

The adequacy, availability and security of financing will be regularly re-assessed and validated against developments in the political and financial area, as well as the real and committed expenditure scenarios.

The financing needs and schemes mentioned above are presented in Table 3.

Table 3. Financing schemes and needs for management of radioactive waste in the Republic of Cyprus.

No.	Practice	Management policy	Financing scheme
1	**Current practices/facilities**		
1a	DSRS under repatriation or to be repatriated.	Such sources remain under regulatory control since their arrival in the Republic till shipment to the manufacturer/supplier. "Take-back" agreements are required to be in place between licensees in the Republic and manufacturers/suppliers in other countries abroad. The endpoint is the return to the receiving country and responsible organisation/ company in that country.	All costs for repatriating waste are posed to the generators of the waste.
1b	Legacy DSRS that cannot be repatriated/exported (cobalt teletherapy units and small sources from medical applications, lightning rods, americium smoke detectors, education sources etc.).	Such sources remain stored in a licensed temporary storage unit until a final solution is decided by the Government. Moreover, the possibility of contracting the re-use of these DSRS to suppliers/manufacturers abroad that manufacture small sources for educational or research purposes shall be explored.	Once a final solution is decided by the Government, all costs will be covered by the Government through the Governmental budget. Currently, there is no cost for the operation of the licensed temporary storage facility.
1c	Medical or research applications (e.g. hospitals conducting nuclear medicine practices or research laboratories).	Short-lived radioactive waste originating from medical or research applications is stored for decay until its activity is low enough to be disposed as normal waste, otherwise to be exported/shipped abroad. Other radioactive waste from this type of facilities will be treated and conditioned for disposal, accordingly.	All costs are covered by the generators of the waste.
1d	Orphan sources and other radioactively-contaminated material.	This radioactive waste will be managed and disposed of, accordingly. Currently, all DSRS, lightning rods, smoke detectors, education sources etc. are stored in a licensed temporary storage	Once a final solution is decided by the Government, all costs will be covered by the Government through the Governmental budget.

No.	Practice	Management policy	Financing scheme
		unit until a final solution is decided by the Government.	Currently, there is no cost for the operation of the licensed temporary storage facility.
1e	NORM	NORM produced in the past due to the activities of a decommissioned fertiliser plant at Vasilikos area in the southern coast of Cyprus was sent abroad for treatment and proper disposal, while a part is kept at the site of its generation, properly stabilised and covered with plastic liner and soil, and is under the supervision and monitoring of RICS.	Past completed activity, not applicable.
1f		NORM originating from the newly-developed hydrocarbons exploration and exploitation industry.	All costs to be covered by the generators of the waste.
2	**Future practices/facilities**		
2a	DSRS	Same as 1a	Same as 1a
2b	Medical or research applications (e.g. hospitals conducting nuclear medicine practices or research laboratories).	Same as 1c	Same as 1c
2c	Orphan sources and other radioactively-contaminated material.	Same as 1d	Same as 1d
2d	NORM	Same as 1e,f	Same as 1e,f
2e	Long-term above ground off-site licensed storage facility or near surface repository	To be decided by the Government	To be decided by the Government
2f	Near-surface geological disposal	To be decided by the Government	To be decided by the Government

6 Key performance indicators for monitoring progress

Based on the milestones and associated timeframes set, and bearing in mind that some milestones and timeframes might be strongly influenced by or dependent on socio-political processes and possibly also by scientific-technical and geological findings, the key performance indicators in order to better monitor progress in the implementation of the National Programme presented in Table 4 are set.

Table 4. Key performance indicators for monitoring progress.

No.	Indicator	Responsibility	Timeframe
1	**National Policy and Strategy/Inventory**		
1a	Development of strategic and annual plans regarding radioactive waste management and submission for governmental approval.	RICS/DLI, MLWSI	On a continuous basis
1b	Maintenance and update the inventory of radioactive waste in the country.	RICS/DLI, MLWSI	On a continuous basis
1c	Revision of the national framework on radiation protection, including the management of spent fuel and radioactive waste, if necessary, based on the Directive 2013/59/Euratom.	RICS/DLI, MLWSI	By 6 February 2018
1d	Arrangement for a self-assessment of the national legislative and regulatory framework, the National Programme and its implementation, and invitation of an international peer review.	RICS/DLI, MLWSI	By 2016, and at least every 10 years thereafter
2	**Reporting**		
2a	Reporting to the Government on an annual basis concerning the activities performed in the period of the report, the amounts and types of radioactive waste that have been managed and on any other relevant issues.	RICS/DLI, MLWSI	On a annual basis
2b	Reporting to the EC of the National Programme and any subsequent significant changes.	RICS/DLI, MLWSI	By 23 August 2015
2c	Reporting to the EC on the implementation of the Directive 2011/70/Euratom, taking advantage of the review and reporting under the Joint Convention.	RICS/DLI, MLWSI	For the first time by 23 August 2015, and every 3 years thereafter
2d	Reporting of the outcomes of the peer review to the EC and other Member States. The report will be also made available to the public where there is no conflict with security and proprietary information.	RICS/DLI, MLWSI	As soon as it becomes available, based on 1d
3	**Infrastructure**		

No.	Indicator	Responsibility	Timeframe
3a	Report on the aassessment of the need for safety/security-upgrade of the existing DSRS storage.	RICS/DLI, MLWSI, Ministry of Health	Short-term
3b	Report on the assessment of the options for conditioning/processing of existing radioactive waste/DSRS and the need for special equipment.	RICS/DLI, MLWSI	Short-term
3c	Initiation of the process for identifying, selecting and proposing appropriate end-points.	RICS/DLI, MLWSI	Short-term
3d	Decision on the creation of a centralised radioactive waste management facility (for storage and/or disposal) and assign responsibilities accordingly.	Proposal by RICS/DLI, MLWSI, decision by the Government.	Short- to medium-term
3e	Authorisation of such a centralised radioactive waste management facility (for storage and/or disposal).	RICS/DLI, MLWSI	Short- to medium-term
3f	Approval of a waste management organisation, if needed.	RICS/DLI, MLWSI	Short- to medium-term
3g	Inspection and enforcement.	RICS/DLI, MLWSI	On a continuous basis
3h	Public involvement in decision-making.	---	On a continuous basis
4	**Radioactive waste routes/inventory**		
4a	Adjustment of the existing classification system, if necessary, based on any new end-point solutions identified for radioactive waste.	RICS/DLI, MLWSI	Short-term, and on a continuous basis thereafter
4b	Assessment of the legacy DSRS disposal options, based on the quantification and characterisation of legacy waste.	RICS/DLI, MLWSI, in consultation with other governmental departments.	Short-term
4c	Identification of requirements for each radioactive waste management step and decide on their implementation.	RICS/DLI, MLWSI, in consultation with radioactive waste generators.	Short-term
5	**Resources**		
5a	Strengthening of the capabilities of the governmental departments involved, mainly of RICS/DLI (increase in the number of staff involved and through training).	The Government, based on RICS/DLI proposal.	Short-term
5b	Assessment of the resources needed, in particular the cost for each management step, including disposal.	RICS/DLI, MLWSI	Short-term
5c	Setting out of fees for radioactive waste management services.	RICS/DLI, MLWSI	Short-term
5d	Assessment of the resources needed for	RICS/DLI,	Short-term

No.	Indicator	Responsibility	Timeframe
	safety/security-upgrade of existing DSRS storage (if considered necessary).	MLWSI	
5e	Assessment of the resources needed, if conditioning/processing of radioactive waste/DSRS (if considered necessary).	RICS/DLI, MLWSI	Short-term

As the National Programme for the radioactive waste management covers a long time period, major key performance indicators might need in future to be revised/updated or complemented by additional ones.

7 References and access to relevant supporting documentation

The following references have been made throughout the text of this National Programme:

[1] Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste

[2] The Protection from Ionising Radiation and Nuclear Safety (Responsible and Safe Management of Spent Fuel and Radioactive Waste) Regulations of 2014 (P.I. 178/2014)

[3a] The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

[3b] The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Ratification) Law of 2009 (Law 13(III)/2009)

[4] The Protection from Ionising Radiation Law of 2002 (Law 115(I)/2002)

[5] The Protection from Ionising Radiation (Amendment) Law of 2009 (Law 8(I)/2009)

[6] The Protection from Ionising Radiation and Nuclear Safety (Amendment) Law of 2011 (Law 127(I)/2011)

[7] Council Directive 96/29/Euratom of 31 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers from ionising radiation

[8] 1990 Recommendations of the International Commission on Radiological Protection, ICRP Publication 60, Ann. ICRP 21 (1-3) (1991)

[9] International Basic Safety Standards for Protection against Ionising Radiation and for the Safety of Radiation Sources, IAEA Safety Series No. 115, IAEA, Vienna (1996)

[10] The 2007 Recommendations of the International Commission on Radiological Protection, ICRP Publication 103, Ann. ICRP 37 (2-4) (2007)

[11] Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards General Safety Requirements Part 3, No. GSR Part 3, IAEA, Vienna (2014)

[12] Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom

[13] Fundamental safety principles: Safety Fundamentals No. SF-1, IAEA, Vienna (2006)

[14] The Protection from Ionising Radiation (Basic Principles) Regulations of 2002 (P.I. 494/2002)

[15] The Protection from Ionising Radiation (Informing the Public about Measures to be applied in Case of Emergency) Regulations of 2002 (P.I. 495/2002)

[16] The Protection from Ionising Radiation (Medical Exposure) Regulations of 2002 (P.I. 497/2002)

[17] The Protection from Ionising Radiation (Control of High-Activity Sealed Radioactive Sources and Orphan Sources) Regulations of 2006 (P.I. 30/2006)

[18] The Protection from Ionising Radiation (Supervision and Control of Shipments of Radioactive Waste and Spent Fuel) Regulations of 2009 (P.I. 86/2009)

[19] The Euratom Treaty

[20] Council Directive 2013/51/Euratom of 22 October 2013 laying down requirements for the protection of the health of the general public with regard to radioactive substances in water intended for human consumption

[21] Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations

[22] The Conventions on Early Warning and Assistance in the case of Nuclear Accident (Ratification) Law of 1988 (Law 164/1988)

[23] The Convention on Nuclear Safety (Ratification) Law of 1998 (Law 20(III)/1998)

[24] The Convention on Physical Protection of Nuclear Material and Nuclear Installations (Ratification) Laws of 1998 and 2012 (Law 3(III)/1998 and Law 38(III)/2012)

[25] The Comprehensive Nuclear Test Ban Treaty (Ratification) Law of 2003 (Law 32(III)/2003)

[26] The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) (Ratification) Law of 1970

[27] The Safeguards Agreement between Cyprus and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (Ratification) Law of 1973 (Law 3/1973)

[28] The Protocol Additional to the Agreement between Cyprus and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (Ratification) Law of 2002 (Law 27(III)/2002)

[29] The International Convention for the Suppression of Acts of Nuclear Terrorism (Ratification) Law of 2007 (Law 44(III)/2007)

[30] The Agreement between the European Community of Atomic Energy, the Member States that do not possess nuclear weapons and the International Atomic Energy Agency, in application of Annexes 1 and 4 of Article III of the Treaty for the non Proliferation of Nuclear Weapons and its Additional Protocol (Ratification) Law of 2007 (Law 37(III)/2007)

[31] The IAEA Standards for Transport of Radioactive Materials

[32] The United Nations Recommendations on the Transport of Dangerous Goods

[33] The International Maritime Dangerous Goods Code (IMDGC)

[34] The International Civil Aviation Organisation (ICAO) Technical Instructions on the Safe Transport of Dangerous Goods

[35] The Universal Postal Union (UPU) Convention

[36] General Safety Guide No. GSG-1 “Classification of radioactive waste”, IAEA, Vienna, 2009

Access to references 1-29 is provided through the website of RICS/DLI at the address www.mlsi.gov.cy/dli.

8 Contact details

Radiation Inspection and Control Service
Department of Labour Inspection
Ministry of Labour, Welfare and Social Insurance
12, Apellis str.
1080 Lefkosia (Nicosia)
Cyprus
Tel.: +357 22405623, +357 22405650
Fax: +357 22405651, +357 22663788
Email: info@dli.mlsi.gov.cy
Website: www.mlsi.gov.cy/dli

ANNEX National Inventory of disused sealed radioactive sources and of radioactive waste in the Republic of Cyprus

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
Disused Sources						
1	Solid	Strontium-90 ^{90}Sr Irradiator Type 2000	0.0781 mGy per rotation 5/7/1989	0024	57.03 Staff Radiation Protection	Harshaw/Filtrol Holland IAEA
2	Solid	Strontium-90 Stability Check Source Source Type Holder 2576	1.11 MBq 10/1983	188 (Device) 2426BB (Source)	57.07 Control Room	Nuclear Enterprises United Kingdom IAEA
3	Solid	Strontium-90 Stability Check Source Source Type Holder 2576	1.11 MBq 4/1984	205 (Device) 2439BB (Source)	57.07 Control Room	Nuclear Enterprises United Kingdom IAEA
4	Solid	Strontium-90 Stability Check Source Unit Type 2562	370 MBq 9/1975	084 (Device) 10245/3, 1031471 (Source)	57.07 Control Room	Nuclear Enterprises United Kingdom IAEA
5	Solid	Strontium-90 Stability Check Source Unit Type 2503/3	370 MBq 1/1981	1934 (Device) 0828BA (Source)	57.07 Control Room	Nuclear Enterprises United Kingdom IAEA
6	Solid	Europeum-152 Reference Source	39.3 kBq 22/10/1991	EFR1121 (Device) CT842 (Source)	57.13 Store Room	Amersham International plc United Kingdom IAEA
7	Solid	Caesium-137 Reference Source	111 MBq 11/4/1996	CDC3103 (Device) 8301GS (Source)	57.13 Store Room	Amersham International plc United Kingdom IAEA
8	Solid	Chlorine-36 Type CIR06022	860 Bq 28/3/1996	EY226	57.13 Store Room	Amersham International plc Germany IAEA
9-80	Solid	Americium-241 Source Ligh/cond.	27.75 MBq	-	Safe Container	Helita France
81	Solid	Radium-226 Source Ligh/cond.	0.37 MBq	-	57.13 Store Room	-

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
82	Solid	Radium-226 Source analyser	0.37 MBq 25/3/1992	-	57.13 Store Room	-
83-85	Solid	Radium-226 Source spectrometer	0.37 MBq 10/6/1992	-	57.13 Store Room	-
86	Solid	Caesium-137	925 MBq	-	57.13 Store Room	-
87	Solid	Caesium-137	2,960 MBq 31/7/1984	-	57.13 Store Room	-
88	Solid	Caesium-137	2,109 MBq 31/7/1984	-	57.13 Store Room	-
89	Solid	Caesium-137	1,480 MBq 16/4/1984	-	57.13 Store Room	-
90	Solid	Caesium-137	1,665 MBq 18/7/1984	-	57.13 Store Room	-
91	Solid	Caesium-137	1,887 MBq 10/4/1984	-	57.13 Store Room	-
92-94	Solid	Americium-241	0.333 MBq	-	57.13 Store Room	-
95	Solid	Americium-241	0.37 MBq	-	57.13 Store Room	-
96	Solid	Cobalt-57	370 MBq 1/2/1995	-	57.13 Store Room	-
97	Solid	Cobalt-57	4.4 MBq 6/3/1995	-	57.13 Store Room	-
98	Solid	Radium-226	116.4 MBq	-	57.13 Store Room	-
99	Solid	Caesium-137	111MBq	-	57.13 Store Room	-
100	Solid	Americium-241	0.39 MBq 1/1/1970	-	57.13 Store Room	-
101	Solid	Cobalt-57	0.42 MBq 1/1/1970		57.13 Store Room	
102	Solid	Mercury - 203	0.76 MBq 1/1/1970	-	57.13 Store Room	-
103	Solid	Sodium-22	0.42 MBq 1/1/1970	-	57.13 Store Room	-
104	Solid	Caesium-137	0.38 MBq 1/1/1970	-	57.13 Store Room	-
105	Solid	Manganese-54	0.40 MBq 1/1/1970	-	57.13 Store Room	-
106	Solid	Cobalt-60	0.39 MBq 1/1/1970	-	57.13 Store Room	-
107	Solid	Yttrium-88	0.38 MBq 1/1/1970	-	57.13 Store Room	-
108	Solid	Europeum- 152	393 kBq 1/12/1991	-	57.13 Store Room	-
109	Solid	Caesium-137	0.87 kBq	-	57.13	-

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
			28/3/1996		Store Room	
110	Solid	Cobalt-57	2.13 kBq 1/5/1996	-	57.13 Store Room	-
111	Solid	Barium-133 Cobalt-57 Demetrium-139 Strontium-85 Caesium-137 Manganese-54 Yttrium-88 Zinc-65	1.92 kBq 1.80 kBq 1.67 kBq 7.06 kBq 3.87 kBq 3.57 kBq 7.96 kBq 8.74 kBq 5/1996	-	57.13 Store Room	-
112	Solid	Chlorine-36	0.86 kBq 28/3/1996	-	57.13 Store Room	-
113	Solid	Strontium-90	370 MBq	170	57.13 Store Room	-
114	Solid	Strontium-90	370 MBq	-	57.13 Store Room	-
115	Solid	Nickel-63 ECD	370 MBq 10/6/1992	311147	57.13 Store Room	-
116	Solid	Nickel-63 ECD	370 MBq 10/6/1992	235894	57.13 Store Room	-
117	Solid	Nickel-63 ECD	370 MBq 10/6/1992	329973	57.13 Store Room	-
118	Solid	Cobalt-60	185 kBq 11/2003	A49589	57.13 Store Room	Philips Harris United Kingdom
119	Solid	Americium-241	185 kBq 4/2003	A49561	57.13 Store Room	Philips Harris United Kingdom
120	Solid	Strontium-90	185 kBq 7/2003	A49578	57.13 Store Room	Philips Harris United Kingdom
121	Solid	Americium-241	185 kBq 10/2001	A59591	57.13 Store Room	Philips Harris United Kingdom
122	Solid	Americium-241	185 kBq 4/2002	A49591	57.13 Store Room	Philips Harris United Kingdom
123	Solid	Americium-241	185 kBq 4/2002	A49591	57.13 Store Room	Philips Harris United Kingdom
124	Solid	Americium-241	185 kBq 10/2001	A49591	57.13 Store Room	Philips Harris United Kingdom
125	Solid	Americium-241	185 kBq 4/2003	A49591	57.13 Store Room	Philips Harris United Kingdom
126	Solid	Americium-241	185 kBq 11/2003	A49591	57.13 Store Room	Philips Harris United Kingdom
127	Solid	Americium-241	185 kBq 4/2002	A49591	57.13 Store Room	Philips Harris United Kingdom
128	Solid	Americium-241	185 kBq 4/2002	A49591	57.13 Store Room	Philips Harris United Kingdom
129	Solid	Strontium-90	185 kBq 7/2003	A49578	57.13 Store Room	Philips Harris United Kingdom

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
130	Solid	Strontium-90	185 kBq 4/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
131	Solid	Americium-241	185 kBq 2/2002	A49591	57.13 Store Room	Philips Harris United Kingdom
132	Solid	Americium-241	185 kBq 6/2001	A49591	57.13 Store Room	Philips Harris United Kingdom
133	Solid	Strontium-90	185 kBq 11/2001	A49578	57.13 Store Room	Philips Harris United Kingdom
134	Solid	Americium-241	185 kBq 2/2002	A49591	57.13 Store Room	Philips Harris United Kingdom
135	Solid	Americium-241	185 kBq 4/2002	A49591	57.13 Store Room	Philips Harris United Kingdom
136	Solid	Americium-241	185 kBq 10/2001	A49591	57.13 Store Room	Philips Harris United Kingdom
137	Solid	Americium-241	185 kBq 10/2001	A49591	57.13 Store Room	Philips Harris United Kingdom
138	Solid	Cobalt-60	185 kBq 5/2001	A49589	57.13 Store Room	Philips Harris United Kingdom
139	Solid	Americium-241	185 kBq 10/2001	A49591	57.13 Store Room	Philips Harris United Kingdom
140	Solid	Strontium-90	185 kBq 4/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
141	Solid	Strontium-90	185 kBq 3/2000	A49578	57.13 Store Room	Philips Harris United Kingdom
142	Solid	Strontium-90	185 kBq 7/2003	A49578	57.13 Store Room	Philips Harris United Kingdom
143	Solid	Cobalt-60	185 kBq 5/2002	A49589	57.13 Store Room	Philips Harris United Kingdom
144	Solid	Cobalt-60	185 kBq 12/2003	A49589	57.13 Store Room	Philips Harris United Kingdom
145	Solid	Americium-241	185 kBq 11/2003	A49591	57.13 Store Room	Philips Harris United Kingdom
146	Solid	Strontium-90	185 kBq 4/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
147	Solid	Strontium-90	185 kBq 7/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
148	Solid	Strontium-90	185 kBq 7/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
149	Solid	Cobalt-60	185 kBq 5/2002	A49589	57.13 Store Room	Philips Harris United Kingdom
150	Solid	Strontium-90	185 kBq 8/1999	0872054	57.13 Store Room	Philips Harris United Kingdom
151	Solid	Strontium-90	185 kBq 5/2000	A49578	57.13 Store Room	Philips Harris United Kingdom
152	Solid	Cobalt-60	185 kBq 5/2002	A49589	57.13 Store Room	Philips Harris United Kingdom
153	Solid	Cobalt-60	185 kBq 11/2003	A49589	57.13 Store Room	Philips Harris United Kingdom

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
154	Solid	Cobalt-60	185 kBq	087210/8	57.13 Store Room	Philips Harris United Kingdom
155	Solid	Cobalt-60	185 kBq 12/1999	A49589	57.13 Store Room	Philips Harris United Kingdom
156	Solid	Cobalt-60	185 kBq 5/2002	A49589	57.13 Store Room	Philips Harris United Kingdom
157	Solid	Cobalt-60	185 kBq 5/2002	A49589	57.13 Store Room	Philips Harris United Kingdom
158	Solid	Cobalt-60	185 kBq 11/2003	A49589	57.13 Store Room	Philips Harris United Kingdom
159	Solid	Cobalt-60	185 kBq 11/2003	A49589	57.13 Store Room	Philips Harris United Kingdom
160	Solid	Strontium-90	185 kBq 9/2002	A495713	57.13 Store Room	Philips Harris United Kingdom
161	Solid	Strontium-90	185 kBq 4/2002	A495713	57.13 Store Room	Philips Harris United Kingdom
162	Solid	Americium-241	185 kBq 10/2001	A49591	57.13 Store Room	Philips Harris United Kingdom
163	Solid	Americium-241	185 kBq 4/2003	A49591	57.13 Store Room	Philips Harris United Kingdom
164	Solid	Americium-241	185 kBq 8/1999	0812167	57.13 Store Room	Philips Harris United Kingdom
165	Solid	Americium-241	185 kBq 11/2003	A49591	57.13 Store Room	Philips Harris United Kingdom
166	Solid	Americium-241	185 kBq	0812167	57.13 Store Room	Philips Harris United Kingdom
167	Solid	Americium-241	185 kBq 10/2001	A49591	57.13 Store Room	Philips Harris United Kingdom
168	Solid	Americium-241	185 kBq 4/2002	A49591	57.13 Store Room	Philips Harris United Kingdom
169	Solid	Americium-241	185 kBq 4/2002	A49591	57.13 Store Room	Philips Harris United Kingdom
170	Solid	Americium-241	185 kBq	08121611	57.13 Store Room	Philips Harris United Kingdom
171	Solid	Strontium-90	185 kBq 11/2001	A49578	57.13 Store Room	Philips Harris United Kingdom
172	Solid	Strontium-90	185 kBq 1/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
173	Solid	Strontium-90	185 kBq 4/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
174	Solid	Strontium-90	185 kBq 11/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
175	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
176	Solid	Strontium-90	185 kBq 11/2001	A49578	57.13 Store Room	Philips Harris United Kingdom
177	Solid	Strontium-90	185 kBq 11/2001	A495713	57.13 Store Room	Philips Harris United Kingdom

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
178	Solid	Strontium-90	185 kBq 5/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
179	Solid	Strontium-90	185 kBq 5/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
180	Solid	Strontium-90	185 kBq 5/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
181	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
182	Solid	Strontium-90	185 kBq 5/2002	A4957$	57.13 Store Room	Philips Harris United Kingdom
183	Solid	Strontium-90	185 kBq 9/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
184	Solid	Strontium-90	185 kBq 7/2003	A49578	57.13 Store Room	Philips Harris United Kingdom
185	Solid	Strontium-90	185 kBq 11/2001	A49578	57.13 Store Room	Philips Harris United Kingdom
186	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
187	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
188	Solid	Strontium-90	185 kBq	Q8721 05/4	57.13 Store Room	Philips Harris United Kingdom
189	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
190	Solid	Cobalt-60	185 kBq 11/2003	A49589	57.13 Store Room	Philips Harris United Kingdom
191	Solid	Cobalt-60	185 kBq 5/2002	A49589	57.13 Store Room	Philips Harris United Kingdom
192	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
193	Solid	Cobalt-60	185 kBq 5/2002	A49589	57.13 Store Room	Philips Harris United Kingdom
194	Solid	Cobalt-60	185 kBq 11/2003	A49589	57.13 Store Room	Philips Harris United Kingdom
195	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
196	Solid	Cobalt-60	185 kBq 11/2003	A49589	57.13 Store Room	Philips Harris United Kingdom
197	Solid	Cobalt-60	185 kBq 5/2002	A49589	57.13 Store Room	Philips Harris United Kingdom
198	Solid	Cobalt-60	185 kBq 5/2002	A49589	57.13 Store Room	Philips Harris United Kingdom
199	Solid	Americium-241	185 kBq 4/2002	A49591	57.13 Store Room	Philips Harris United Kingdom
200	Solid	Strontium-90	185 kBq 4/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
201	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
202	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
203	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
204	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
205	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
206	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
207	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
208	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
209	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
210	Solid	Strontium-90	185 kBq 4/2002	A49578	57.13 Store Room	Philips Harris United Kingdom
211	Solid	Cobalt-60	185 kBq 5/2002	A49589	57.13 Store Room	Philips Harris United Kingdom
212	Solid	Americium-241	185 kBq 10/2001	A49591	57.13 Store Room	Philips Harris United Kingdom
213	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
214	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
215	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
216	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
217	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
218	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
219	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
220	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
221	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
222	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
223	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
224	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
225	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
226	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
227	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
228	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
229	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
230	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
231	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
232	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
233	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
234	Solid	Radium-226	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
235	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
236	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
237	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
238	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
239	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
240	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
241	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
242	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
243	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
244	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
245	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
246	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
247	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
248	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
249	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
250	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
251	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
252	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
253	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
254	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
255	Solid	Radium-226	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
256	Solid	Radium-226	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
257	Solid	Radium-226	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
258	Solid	Radium-226	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
259	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
260	Solid	Americium-241	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
261	Solid	Strontium-90	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
262	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Griffin and George United Kingdom
263	Solid	Cobalt-60	185 kBq		57.13 Store Room	Griffin and George United Kingdom
264	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Griffin and George United Kingdom
265	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Griffin and George United Kingdom
266	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Griffin and George United Kingdom
267	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Griffin and George United Kingdom
268	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Griffin and George United Kingdom
269	Solid	Strontium-90	185 kBq	-	57.13 Store Room	-
270	Solid	Strontium-90	185 kBq	-	57.13 Store Room	-
271	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	-
272	Solid	Americium-241	185 kBq	-	57.13 Store Room	-
273	Solid	Americium-241	185 kBq	-	57.13 Store Room	-

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
274	Solid	Strontium-90	185 kBq	-	57.13 Store Room	-
275	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	-
276	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	-
277	Solid	Strontium-90	185 kBq	-	57.13 Store Room	-
278	Solid	Plutonium-239	185 kBq	-	57.13 Store Room	Philips Harris United Kingdom
279	Solid	Th(OH)4	25 grams	-	57.13 Store Room	Griffin and George United Kingdom
280	Solid	Americium-241	4.6 kBq	-	57.13 Store Room	Panax Equipment Ltd
281	Solid	Strontium-90	4.6 kBq	-	57.13 Store Room	Panax Equipment Ltd
282	Solid	Cobalt-60	185 kBq	-	57.13 Store Room	Panax Equipment Ltd
283	Solid	U O8	-	-	57.13 Store Room	Panax Equipment Ltd
284	Solid	Th O2		-	57.13 Store Room	Panax Equipment Ltd
285	Solid	Cobalt-60 Insect Steriliser	269 TBq 8/1971	G-C220 S/N128	Safe container	Atomic Energy of Canada LTD Canada
286	Solid	Cobalt-60	127 TBq 19/12/1991	ATC C/9	Safe container	Advanced Medical Systems inc. United Kingdom
287	Solid	Cobalt-60	266 TBq 15/6/1994	780	Safe container	Atomic Energy of Canada LTD Canada
288	Solid	Cobalt-60	113 TBq 7/1994	RTGS-10	Safe container	Shimatsu Corporation Japan
289	Solid	Caesium-137 Brachytherapy	2,960 MBq 31/7/1984	0518 MX	Safe container	-
290	Solid	Caesium-137 Brachytherapy	2,109 MBq 31/7/1984	0517 MX	Safe container	-
291	Solid	Caesium-137 Brachytherapy	1,480 MBq 16/4/1984	0511 MX	Safe container	-
292	Solid	Caesium-137 Brachytherapy	1,480 MBq 16/4/1984	0512 MX	Safe container	-
293	Solid	Caesium-137 Brachytherapy	1,665 MBq 18/7/1984	0513 MX	Safe container	-
294	Solid	Caesium-137 Brachytherapy	1,665 MBq 18/7/1984	0514 MX	Safe container	-
295	Solid	Caesium-137 Brachytherapy	1,887 MBq 10/4/1984	0515 MX	Safe container	-

No.	Form (Solid, liquid gas)	Isotope and Device type	Activity and date	Serial number / code	Storage facility or/and room*	Manufacturer Country of Origin Supplier
296	Solid	Caesium-137 Brachytherapy	1,887 MBq 10/4/1984	0516 MX	Safe container	-
297-312	Solid	Crypton-85 Ligh/cond.	9,250 MBq	-	Safe container	General Systems Belgium
313 – 331	Solid	Americium -241 Smoke Detector	37 kBq	-	Safe container	Pittway Italy
332 – 352	Solid	Americium -241 Smoke Detector	37 kBq	-	Safe container	-
353	Solid	Americium -241 Smoke Detector	33.3 kBq	-	Safe container	First Alert United Kingdom
354 – 357	Solid	Americium -241 Smoke Detector	33.3 kBq	-	Safe container	-
358	Solid	Nickel 63 ECD	555 MBq 10/2011	U3502	Safe container	-
359	Solid	Iridium-192	1.739 TBq (47.1 Ci)	-	RICS/DLI	Amersham
360	Solid	Americium-241 - Berilium	3.7 GBq (100mCi)	276.4.68	RICS/DLI	Berthold
361	Solid	Caesium-137	111 MBq (3mCi)	277.4.68	RICS/DLI	Berthold
362 - 363	Solid	Am-Be neutron source	1.850 – 3.700 MBq	-	Cybarco	-
364 - 365	Solid	Am-Be neutron source	277.5 MBq	CAA-3017 CAA-3018	Department of Public Works	Troxler Laboratories, USA

Radioactive Waste from Medical or Research Applications

Small volumes of short-lived radioactive waste from medical or research applications is stored for decay until its activity is low enough to be disposed as normal waste. Medical centres in Cyprus use about 6 TBq of Tc-99m and 3 TBq of I-131 per year. Other isotopes such as In-111, I-125, Ga-67, and Th-201 are also used in medical centres and specialised laboratories but both their volumes and activity concentrations are very small (a few GBq per year in total). Nearly all of these enter the sewage system, as liquid waste. Due to the nature of these radioisotopes (short half-life), and/or the very small quantities used, there is no need to segregate them from regular waste.

* No. 1-358: Lefkosia (Nicosia) General Hospital