Western European
WENRA WGWD
Nuclear Regulators Association

Report

Radioactive Waste Disposal Facilities Safety Reference Levels

Report of Working Group of Waste and Decommissioning (WGWD)

Version 2.3, May 2026

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Preface to version 2.3

The purpose of this version 2.3 of the radioactive waste disposal facilities safety reference levels report is to provide an update on the implementation of the radioactive waste disposal facilities safety reference levels in the legal and regulatory frameworks of WENRA member countries.

Benchmarking of the disposal safety reference levels started in 2015, after the publication of a comprehensive set of safety reference levels in version 2.2 of the report, in 2014. Since then, 17 of the hitherto 18 WENRA member states (not counting newly admitted Poland or associated member states, neither of whom having yet started their benchmarking) have officially started their benchmarking by providing a self-assessment of their national regulatory framework for the disposal of radioactive waste, with the exceptions of the Netherlands.[1]

[1] The Netherlands has a policy for disposal of spent fuel and radioactive waste. Regulations will be present in time in relation to the planned decision on the disposal option and location, expected around 2050.

Executive Summary

The Western European Nuclear Regulators' Association (WENRA) is an international body made up of the Heads and senior staff members of Nuclear Regulatory Authorities of European countries with nuclear power plants. The main objectives of WENRA is to develop a common approach to nuclear safety, to provide an independent capability to examine nuclear safety and to be a network of chief nuclear safety regulators in Europe exchanging experience and discussing significant safety issues.

To accomplish these tasks two working groups within the WENRA have been established - Reactor Harmonisation Working Group (RHWG), Working Group on Waste and Decommissioning (WGWD) and, the Working Group on Research Reactors (WGRR).

This document contains the results of the work of WGWD in the area of the safety of disposal facilities for radioactive waste. The objective of this report is to provide safety reference levels for these facilities, which were based on the RHWG report, other WGWD reports and ad hoc IAEA documents (requirements, guidance, etc). Although the IAEA safety standards establish an essential basis for safety of all nuclear installations covering also radioactive waste disposals, the WENRA safety reference levels incorporate more facility specific requirements.

Part III of this report describes the results of the benchmarking processes and the status of the country-specific national action plans.

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Terms of Reference

of the WESTERN EUROPEAN NUCLEAR REGULATORS´ ASSOCIATION

(WENRA)

14 November 2023

1. We, the Heads of Nuclear Regulatory Authorities (signatories[2]) of European countries with nuclear power plants, gathered within WENRA, the independent association of European national nuclear regulators, commit to work together to continuously improve and harmonise nuclear safety to as high as reasonably practicable levels.
2. We commit, in particular, to maintain and further develop a common set of up to date safety reference levels (SRLs) aiming at a high safety level, strive for their implementation in our national regulatory frameworks and benchmark their implementation.
3. WENRA's vision is to have consistent high levels of nuclear safety in Europe, protecting people and the environment now and in the future.
4. Besides WENRA full members, other heads of national regulatory authorities may participate in WENRA under the status of associated member or observer member. The application process is defined in a separate document, approved by WENRA, defines the application process, the main criteria considered by WENRA, as well as the rights and duties of associated members and observer members. In any case admission of a new member remains a sovereign decision by WENRA full members.
5. WENRA, as an independent association, does not receive any instructions from national governments nor from EU or other international institutions.
6. Decisions in the name of WENRA are taken by consensus among full members and are expected to be applied by each of members.
7. Taking into account the European and international environment in the nuclear field, WENRA defines and updates regularly strategic objectives that streamline its actions.
8. Final documents reflecting WENRA's activities or positions on safety related matters are made public.
9. Working groups are established and shutdown through WENRA decisions during plenary.
10. WENRA members provide adequate resources to ensure effective working of WENRA and its working groups.

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[2] *WENRA full members are the signatories of the Terms of Reference*

11. WENRA keeps regular relationships with the European Union institutions, in particular ENSREG, to discuss any significant safety-related topic of interest, identify emerging safety issues that can challenge its members, address interface and avoid duplication in respective activities and provide advice on nuclear safety and regulatory matters.
12. WENRA develops and maintains suitable relations with regulatory authorities from other countries as well as with international organisations.
13. WENRA ensures appropriate opportunities for stakeholders to be informed of or, when applicable, to contribute to its work.

Glossary

For the purpose of this document, the following definitions have been adopted, although the working group recognizes the possibility of some differences with national and international documents.

Barriers
A natural or engineered obstruction that provides safety functions.

Multiple barriers
Two or more natural or engineered barriers.

Natural barrier
Barrier provided by the host environment.

Engineered barrier
Barrier provided by engineered components.

Closure (based on 2011/70/Euratom)
'Closure' means the completion of all operations at some time after the emplacement of radioactive waste in a disposal facility, including the final engineering or other work required to bring the facility to a condition that will be safe in the long term.

Commissioning (from IAEA glossary –edition 2007)
The process by means of which systems and components of facilities and activities, having been constructed, are made operational and verified to be in accordance with the design and to have met the required performance criteria. In this report commissioning means commissioning of the initially constructed part of the disposal facility and newly constructed parts**.**

Computational model
The representation of the conceptual and the mathematical models in a form in which computations can be carried out.

Conditioning (from IAEA glossary –edition 2007)
Those operations that produce a waste package suitable for handling, transport, storage and/or disposal. Conditioning may include the conversion of the waste to a solid waste form, enclosure of the waste in containers and, if necessary, provision of an overpack.

Construction (from IAEA glossary –edition 2007)
The process of manufacturing and assembling the components of a disposal facility, the carrying out of civil works, the installation of components and equipment and the performance of associated tests. Construction includes any necessary excavation work.

Construction work during operation refers to the civil and underground work carried out by the licensee to develop further the disposal facility (e.g.: create new galleries, create new vaults). Construction includes not only initial construction but may also include construction during operation depending on the national programme.

Containment
Provisions of a disposal system that limit the release and the dispersion of radioactive substances.

Control
Function, power or means of directing, regulating or restraining. For example, *control* typically implies not only checking or monitoring something but also ensuring that corrective or enforcement measures are taken if the results of the checking or monitoring indicate such a need.

Regulatory control
Control or regulation applied to facilities or activities by a regulatory body.

Decommissioning
'In this report, the term decommissioning as applied to a radioactive waste disposal facility includes decontamination, dismantling and removal of ancillary surface facilities, such as waste handling equipment and stores, so that long term protection of the public and the environment is achieved with respect to these facilities. It also includes dismantling and removal of operational equipment from the facility itself, as considered appropriate. Decommissioning is here distinguished from closure which includes all measures necessary to bring a radioactive waste disposal facility to a condition that will be safe in the long term.

Design (based on IAEA glossary – edition 2007)
Development of a concept, detailed plans, supporting calculations and specifications for a facility and its parts.

Design basis
The range of conditions and events taken explicitly into account in the design of a facility, according to established criteria, such that the facility can withstand them without exceeding authorized limits by the planned operation of safety systems.

Disposal (from IAEA – SSR5).
Disposal refers to the emplacement of solid radioactive waste into a facility with no intention of retrieving the waste.

Disposal facility
Any facility the primary purpose of which is radioactive waste disposal. Such a facility may include natural and engineered components. It includes the part of the facility where the waste is emplaced and the auxiliary facilities needed for its construction, operation and closure.

Disposal system
The disposal system is composed of the part of the facility where the waste is emplaced and those parts of the host environment whose properties and behaviour contribute to post-closure safety.

Experience feedback
Experience feedback should be provided by a system that facilitates the sharing of experiences that have led to significant corrective actions in human performance, hardware or safety management practices, or have revealed vulnerabilities that are not yet fully incorporated into the safety case. In addition, the system should provide safety relevant information arising from research programmes, even if the concern was raised for reasons other than an incident at a disposal or other nuclear facility. The key criterion for sharing experience should not be whether a safety event is significant, but rather whether the safety lesson is significant.

Features, events and processes
The general dictionary definitions of these concepts are (1) feature – a distinctive attribute or aspect of something, (2) event – a thing that happens or takes place, especially one of importance, and (3) process – a naturally or artificially induced sequence of events leading to an outcome or product. In this report, which is concerned with safety aspects of a radioactive waste disposal facility, FEPs are these concepts applied to the waste, to engineered aspects of the disposal facility, to the geological environment, and to interactions among any of these, for the purpose of constructing a safety case.

Graded approach (from IAEA glossary –edition 2007)
1. For a system of control, such as a regulatory system or a safety system, a process or method in which the stringency of the control measures and conditions to be applied is proportionate, to the extent practicable, to the likelihood and possible consequences of, and the level of risk associated with, a loss of control.
2. An application of safety requirements that is proportionate to the characteristics of the practice or source and to the magnitude and likelihood of the exposures.

Host environment
The local geology (rock) within which a radioactive waste disposal facility is directly located.

Isolation
Provisions of a disposal system that ensure that the waste is protected from both natural and human external disturbances.

Licensee

The licensee is the legal or natural person or organisation having the overall responsibility for a facility or activity (the responsible organization) for waste disposal as specified in a licence.

In this document, the term licensee also covers the prospective licensee, when the SRL refers to actions to be implemented prior to the licence application. In such a case, the organization responsible for implementing the SRL is the organization in charge of developing the concept of a disposal facility before the licence is applied for.

Management system
A set of interrelated or interacting elements (system) for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner. The management system integrates all elements of an organization into one coherent system to enable all the organization's objectives to be achieved. These elements include the organizational structure, resources and processes. Personnel, equipment and organizational culture as well as the documented policies and processes are parts of the management system. The organization's processes have to address the totality of the requirements on the organization as established in, for example, IAEA safety standards and other international codes and standards.

The term management system reflects and includes the evolution in the approach from the initial concept of 'quality control' (controlling the quality of products) through 'quality assurance' (the system to ensure the quality of products) to 'quality management' (the system to manage quality).

Model validation
Model validation is the process of determining whether a conceptual and/or computational model is an adequate representation of the real case being modelled, by comparing the predictions of the model with observations of the real case or with experimental data. Code validation is the assessment of the accuracy of values predicted by the code against relevant experimental data for the important phenomena expected to occur.

Model verification
Model verification is the process of determining that a computational model correctly implements the intended conceptual model or mathematical model; that is, whether the controlling physical equations and data have been correctly translated into the computer code. It includes ensuring that the numerical solutions provided by the computational model are sufficiently accurate for their intended use. System code verification is the review of source coding in relation to its description in the system code documentation.

Monitoring, inspection, surveillance

Monitoring (adapted from IAEA DS357 – version 15/03/11)
Continuous or periodic observation and measurements of environmental, engineering,

or radiological parameters to help evaluate the behaviour of components of the waste disposal facility and system, or of the impacts of the waste disposal facility and system on the public and the environment.

Inspection (from IAEA glossary – edition 2007)
An examination, observation, measurement or test undertaken to assess structures, systems and components and materials, as well as operational activities, technical processes, organizational processes, procedures and personnel competence.

Surveillance
Overall observation of the disposal facility and system, including monitoring, testing and inspection, during operational phase and, if required, after the closure of the facility.

Passive safety feature
A safety feature which does not depend on an external input and/or continuous supply of media.

Post-closure (based on IAEA SSR-5)
Phase beginning at the time when all the engineered containment and isolation features have been put in place, operational buildings and supporting services have been decommissioned and the disposal system is in its final configuration.

Postulated initiating events (PIE)
An event identified during design as capable of leading to anticipated operational occurrences or accident conditions. The primary causes of postulated initiating events may be credible equipment failures and operator errors (both within and external to the facility) or human induced or natural events.

Protection and Safety
The protection of people and the environment against exposure to ionizing radiation or radioactive materials and the safety of radiation sources, including the means for achieving this, and the means for preventing accidents and for mitigating the consequences of accidents should they occur.

Safety is primarily concerned with maintaining control over sources, whereas radiation protection is primarily concerned with controlling exposure to radiation and its effects. Clearly the two are closely connected: radiation protection is very much simpler if the source in question is under control, so safety necessarily contributes towards protection. Sources come in many different types, and hence safety may be termed nuclear safety, radiation safety, radioactive waste safety or transport safety, but protection (in this sense) is primarily concerned with protecting humans and the environment against exposure, whatever the source, and so also is radiation protection.

Radiation protection
The protection of people ***and the environment*** from the effects of exposure to ionizing radiation, and the means for achieving this.

Nuclear safety
The achievement of proper operating conditions, prevention of accidents or mitigation of accident consequences, resulting in protection of workers, the public and the environment from undue radiation hazards.

Retrievability
The ability to retrieve waste that has been disposed of.

Reversibility
The ability to reverse waste disposal operations.

Robustness (of a component or a system)
Ability of a component or system to fulfil its assigned safety functions over the timescale required by the safety case despite perturbing internal and external events and processes, and taking into account uncertainties.

Safety

Operational safety
The protection of people and the environment against radiation risks, and the safety of the facility and activities that give rise to radiation risk as a result of operations (such as construction, waste emplacement, decommissioning and closure) with due consideration to potential exposures during normal operation, anticipated operational occurrences and possible accidents.

Post-closure safety
Protection of people and the environment against radiation risks after closure of the disposal system taking into account the various possible ways it might evolve.

Safety case
Collection of scientific and technical arguments and evidence in support of the safety of a disposal facility and system.

Safety assessment
Safety assessment entails evaluating the performance of a disposal system and quantifying its potential radiological impact on human health and the environment. Safety assessment is a major component of the safety case for a disposal facility and should take account of the potential radiological impacts of the facility, both in operation and after closure. Radiological impacts may arise from gradual processes after closure that may cause the facility and its components (e.g. natural and engineered barriers) to degrade, and from discrete disturbing events that could affect the isolation of the waste (e.g. earthquakes, faulting and inadvertent

human intrusion). Safety assessment should demonstrate whether the disposal facility complies with applicable regulatory requirements.

Safety functions (based on IAEA SSR-5, para 3.32)
Specific function that must be provided for safety, either during operation of the disposal facility (operational safety functions) or after the closure of the disposal system (post-closure safety functions).

> **Operational safety functions**
> are provided by technical systems and control actions.
>
> **Post-closure safety functions**
> are provided by engineered and natural barriers and post-closure control actions (if any). They are achieved by means of physical or chemical properties or processes that contribute to containment and isolation, such as: impermeability to water; limited corrosion, dissolution, leach rate and solubility; and retention.

Scenario (based on IAEA SSG-23)
Scenarios are descriptions of alternative possible evolutions, or alternative possible future states, of the disposal system. The development of scenarios is used to identify and define 'assessment cases' that are consistent with the assessment context. Each assessment case may represent or bound a range of similar possible evolutions or states of the disposal system.

Different types of scenario are usually considered in an assessment, including a 'base case scenario' and 'alternative evolution scenarios', which will include disturbing events and processes, and may explore other uncertainties relating to the base case. The alternative scenarios will have most aspects in common with the base case scenario, but particular aspects will differ between the scenarios, so as to explore the sensitivity of the safety assessment to those aspects.

Two main methods have been used for constructing scenarios. The first may be described as a 'bottom-up' method and is based on screening of features, events and processes. Use of this method requires a comprehensive list of possible or postulated features, events and processes as a starting point. The second may be described as a 'top-down' method and is based on analyses of how the safety functions of the disposal system may be affected by uncertainties and by disturbing events and processes.

Site characterization
Detailed surface and subsurface investigations and activities at a selected site and its environment.

Siting (from IAEA glossary – edition 2007)
The process of selecting a suitable site for a disposal facility, including appropriate assessment and definition of the related design bases. The siting process for a disposal facility is

particularly crucial to its post-closure safety; it may therefore be a particularly extensive process, and can be divided into the following stages: concept and planning, area survey, fundamental site characterization, site confirmation.

Standards
Measures of quality or suitability for a specified purpose, recognized by authority or by general consent and expressed in terms of quantitative and/or qualitative rules or criteria. Examples are quality standards and safety standards.

Structures, systems and components (SSCs)
A general term encompassing all of the elements (items) of a facility or activity which contribute to protection and safety, except human factors.

Structures are the passive elements: buildings, vessels, shielding, etc.

A system comprises several components, assembled in such a way as to perform a specific (active) function.

A component is a discrete element of a system or structure.

Uncertainties
Uncertainties are lack of sureness or knowledge in any of several respects about something. Relevant uncertainties in the context of this report are uncertainties that may affect the overall safety of the disposal facility and system.

In the particular context of safety assessment of a waste disposal system, safety demonstration is particularly subject to uncertainties because of the long timescales that may be involved. Relevant uncertainties to be considered relate to data or parameter values considered in the safety assessment; limited understanding of certain mechanisms, modelling difficulties and the general lack of knowledge about the future.

Uncertainty management
Process of accounting for, grading and eliminating, reducing or otherwise dealing with the uncertainties involved with establishing the safety case. This may include uncertainties managed at the level of the safety concept and design as well as those considered in the safety assessment.[3]

[3] Uncertainties and the way of dealing with them can be divided in various categories:
1. Uncertainties with minor influence on the results of safety assessment need not necessarily further consideration.
2. Reducible uncertainties with substantial influence on the results of safety assessment should be reduced through e.g. further research, improved modelling or design modifications.
   Irreducible uncertainties with substantial influence on the results of safety assessment should be considered through e.g. specific scenarios, conservative assumptions or probabilistic assessments.

Waste acceptance criteria (for disposal)
Criteria applicable to waste packages and unpackaged waste accepted for emplacement in a disposal facility. Such criteria must be fully consistent with the safety case for the disposal facility in operation and after closure. They may include criteria introduced for operational as well as for safety reasons. They may be specified by the regulatory body or by an operator. If specified by an operator, they may be approved by the regulatory body.

Waste form (from IAEA glossary – edition 2007)
Waste in its physical and chemical form after treatment and/or conditioning (resulting in a solid product) prior to packaging. The waste form is a component of the waste package.

Waste generator (based on IAEA glossary – edition 2007)
The operating organisation of a facility or activity that generates waste. For this report the scope of the term waste generator/producer is extended to any organization responsible for the management of the waste: either the waste generator/producer himself or a license holder to whom this responsibility has been entrusted by competent authorities.

Waste package (from IAEA glossary – edition 2007)
The product of conditioning that includes the waste form and any container(s) and internal barriers (e.g., absorbing materials and liners), as prepared in accordance with requirements for handling, transport, storage and/or disposal.

List of Abbreviations

ALARA	As low as reasonably achievable
EU	European Union
IAEA	International Atomic Energy Agency
NAP	National Action Plan
NEA	Nuclear Energy Agency (OECD)
OLC	Operational limits and conditions
PIE	Postulated initiating event
PSR	Periodic safety review
R&D	Research and development
RHWG	(WENRA) Reactor Harmonization Working Group
SC	Safety case
SSCs	Structures, systems and components
SRL	Safety reference level
WAC	Waste acceptance criteria
WENRA	Western European Nuclear Regulators' Association
WGRR	(WENRA) Working Group on Research Reactors
WGWD	(WENRA) Working Group on Waste and Decommissioning

Part 1
Introduction and Methodology

1.1 Introduction

This report is the result of an effort by the Working Group on Waste and Decommissioning (WGWD) of WENRA from 2010 to 2026, in particular focussing on the period since the publication of the previous version of this report, v2.2, in 2014. It presents the Safety Reference Levels (SRLs) for radioactive waste disposal facilities that are thought to be a good basis for harmonisation of safety between WENRA member countries.

The purpose of the current updated version of the report is to provide an account for the status of implementation of the SRLs in WENRA countries´ legal and regulatory framework.

The SRLs cannot be considered as independent European safety requirements because current legislation in WENRA member states would not allow that due to fundamental differences reflecting the historical development in European countries. The SRLs are a set of requirements against which the situation of each country is assessed and it is each country's responsibility to implement actions to ensure that these levels are reached.

1.1.1 Background

WENRA, which was established in February 1999, is the association of the Heads of nuclear regulatory authorities of European countries with at least one nuclear power plant in construction, operation or decommissioning phase. WENRA was formally extended in 2003 to include new and future European Union (EU) member states. Currently, regulatory authorities from the following countries are members of WENRA: Belgium, Bulgaria, the Czech Republic, Finland, France, Germany, Hungary, Italy, Lithuania, the Netherlands, Poland, Romania, Slovenia, Slovak Republic, Spain, Sweden, Switzerland, Ukraine and the United Kingdom. Authorities from Canada, the Russian Federation[4] and Japan have the status of "associated members" of WENRA, and authorities from various other states have been admitted to WENRA meetings as "observers", including Austria and the USA. However, while some observers have been present and active at WGWD meetings, the preparation of this report as well as the development of the SRLs and efforts to harmonise their national regulations have been undertaken only by the members.

The original objectives of the Association were:

[4] Russian Federation does since 2022 not participate in WENRA activities.

- to provide the EU institutions with an independent capability to examine nuclear safety and its regulation in applicant countries,
- to provide the EU with an independent capability to examine nuclear safety and regulation in candidate countries,
- to evaluate and achieve a common approach to nuclear safety and regulatory issues which arise.

The second objective of WENRA has been fulfilled by the preparation of a report on nuclear safety in candidate countries having at least one nuclear power plant. After May 1st, 2004, when most of these candidate countries became regular EU member states, the new WENRA tasks, based on first and third original Association's objectives, became:

- provide the European Union institutions with an independent capability to examine nuclear safety and its regulation in applicant countries and
- to develop common approaches to nuclear safety and regulations and to encourage the harmonization of practices.

Each WENRA member commits to implementing SRLs in its regulatory framework and to tracking this implementation. WENRA associated members commit to considering implementing the SRLs.

Each country undertakes a national self-assessment against each SRL, which is then benchmarked or moderated by the members of WGWD, with a rating of A (fully conforming with SRL), B (not applicable, or SRL addressed satisfactorily in another way) or C (improvements needed). A WENRA member which identified areas for improvement then develop a National Action Plan (NAP) to respond to the findings, usually within a period of 2 to 3 years, and undergo re-benchmarking.

To perform these tasks three working groups have been established – initially the Reactor Harmonization Working Group (RHWG) and the Working Group on Waste and Decommissioning (WGWD) and in 2021 the Working Group on Research Reactors (WGRR). The work of WGWD started in 2002.

1.1.2 Objective

The objective of this report is to provide SRLs for specialized radioactive waste disposal facilities in line with the safety objectives described by the 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. This project adopts the position, in accordance with the Directive, that radioactive waste, including spent fuel when considered as waste, requires containment and isolation from humans and the living environment over the long term. Its specific nature (content of radionuclides) requires arrangements to protect human health and the environment against dangers arising from ionizing radiation, including disposal in appropriate facilities as the end point of its management. Although the safety objective is the same whatever the type of disposal facility, the means for reaching it may

differ considerably depending on the type of waste to be disposed of. The requirements should accordingly be implemented using a graded approach as stated by the Directive, proportionate to the hazard of the radioactive waste.

The SRLs in this report are oriented toward licensees of the radioactive waste disposal facilities, who are responsible for the safety of such facilities until the termination of the licences. Prior to a licence application, the SRLs require action to be undertaken by the organisation responsible for developing a disposal concept. For example, quality assurance programmes and a properly structured organization are needed to ensure appropriateness of actions undertaken before the licensing process is started. The SRLs apply particularly to geological disposal facilities, where development of the project is likely to span over several decades and preparatory work - mainly geological investigations and R&D programmes - needs to be implemented before the licence application. When a requirement applies to a future licensee who is not yet regulated under nuclear regulation, the future licensee will need to demonstrate that it has fulfilled the requirement in order to obtain a licence. Some of the SRLs can also be used by the regulatory body to support review and evaluation of the safety of disposal facilities.

According to the WENRA policy statement the harmonization process of the national legal systems in member states should be completed by the year 2010. In 2009 WENRA decided to extend the deadline in case of the disposal SRLs.

1.1.3 Scope

The SRLs are focused on near surface, intermediate depth or deep geological facilities for disposal of radioactive waste in solid form. In the case of geological disposal, this can include spent fuel when it is regarded as radioactive waste. As this document is intended to cover a wide range of facilities, the application of the reference levels to particular facilities will need to be proportionate to the hazards associated with the wastes being disposed of, and to be interpreted in accordance with the type of facility.

This report has been broadly modelled on previous reports prepared by the WENRA WGWD such as the Storage report and the Decommissioning report, but taking into account the particular issues associated with radioactive waste disposal. It has also taken into account a wide range of international and national documents relating to radioactive waste disposal, especially including those listed under “Methodology” below. Certain decisions were taken by the WGWD to limit the scope of the report. These are explained in later paragraphs of this “Scope” section.

In some countries disposal facilities for very low level waste are not regulated under the regulations for nuclear facilities. Even in this case, it is recommended that the requirements developed in this report are taken into consideration in a suitably proportionate manner for these facilities.

Residual materials containing radionuclides of natural origin (NORM - mining and mineral processing waste as referred to in IAEA SSR-5) are not within the scope of this report. Various ways of managing such waste are implemented in different countries, depending on the characteristics and level of activity of the waste. Some of this waste may be managed in radioactive waste disposal facilities with respect to the level of radioactivity, for example as low-level radioactive waste. Other types of waste may be managed either in landfills or even directly on the sites where they were produced, when intrinsic radioactivity is low and there are large amounts of waste. Although not within the scope of this report, it is recommended that in this last case some surveillance may be implemented to confirm the safe management of this waste.

The site selection process is not addressed in the report because this process is specific to each country taking into account societal and political considerations and different regulatory regimes. The SRLs presented here might, however, inform considerations during the site selection process. SRLs in this report start with the disposal facility development covering all aspects of safety once a site has been selected.

Decommissioning aspects of disposal facilities are not regulated in this report. SRLs of the WENRA decommissioning report are to be applied, as appropriate.

After closure, safety of the disposal system is provided by means of passive safety features, possibly accompanied by surveillance, particularly for near surface disposal facilities. The licence will be terminated after a period of surveillance under regulatory control, when all the necessary technical, legal and financial requirements have been fulfilled. Thereafter, the assignment of responsibilities is outside the scope of this report.

Because WGWD members do not all regulate the following matters, WGWD has concentrated on relevant nuclear and waste safety requirements and, in particular, it has not taken into account other regulatory requirements such as Environmental Impact Assessment regulation (required by EU directives), discharge authorization, chemical toxicity of radioactive waste disposed of, management of non-radioactive waste, conventional occupational health and safety, physical protection including safeguards, and funding issues. These other regulatory requirements should be treated in accordance with the applicable national regulatory systems.

Article 27 of Council Directive 2011/70/Euratom states that: “Member States should ensure that adequate funding is available for the management of spent fuel and radioactive waste.” As specified in the Directive, the Member State has ultimate responsibility for funding radioactive waste management. However, based on the “polluter pays” principle, within the Member State funding should come from the organization responsible for the waste. The licensee of the disposal facility may also have responsibilities relating to assessing costs for disposal and to ensuring proper funding mechanisms for development, operation and closure of the facility. In some cases the licensee of the disposal facility may be the same as the organisation responsible for the waste. Because of the special nature and potential

complexity of the funding issue we have not judged it appropriate to deal with it in this report. If WGWD were to specify a requirement on this topic this might be considered in its future reports on waste processing and management. It has to be kept in mind that, in some countries, these matters are addressed by other national regulatory organizations.

With respect to chemical toxicity of the waste, the WGWD recognises that, although not always in the mandate of its members, protection from the non-radioactive hazardous content of the waste represents an important issue. Therefore the WGWD members stress the need for this issue to be duly handled by the licensee, so as to comply with the appropriate regulatory requirements.

1.1.4 Structure

The report consists of three main parts.

Part 1 provides an introduction to the current version of the report and of the methodology used by WGWD.

Part 2 of the report presents the specific waste disposal reference levels and the corresponding appendices.

Part 3 of the report describes the results of the benchmarking process and the undertaken or foreseen efforts of the WENRA Member States to implement these SRLs in the national legal and regulatory framework on the basis of national action plans (NAP).

1.2 Methodology

The working methodology of WGWD has gone through several steps and changes since 2002, when the working group was established. A list of topics to be covered by WGWD was defined taking into account the common field of responsibility of WENRA members. Generally for the development of disposal SRLs relevant IAEA documents were considered, the latest list of which is as follows:

- Fundamental Safety Principles, IAEA Safety Fundamentals SF-1, Vienna (2006).
- Governmental, Legal and Regulatory framework for Safety. IAEA General Safety Requirements, GSR Part 1 (Rev. 1), Vienna (2016).
- Leadership and Management for Safety, IAEA General Safety Requirements, GSR Part 2, Vienna (2016).
- Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA General Safety Requirements, GSR Part 3, Vienna (2014).
- Safety Assessment for Facilities and Activities, IAEA General Safety Requirements, GSR Part 4 (Rev.1), Vienna (2016).
- Predisposal Management of Radioactive Waste - Safety Requirements; IAEA General Safety Requirements, GSR Part 5, Vienna (2009).
- Preparedness and Response for a Nuclear or Radiological Emergency, IAEA General Safety Requirements, GSR Part 7, Vienna (2015).Disposal of Radioactive Waste No. SSR-5; IAEA Specific Safety Requirements, Vienna (2011).
- Classification of radioactive waste, IAEA General Safety Guide, GSG-1, Vienna (2009).
- Geological disposal facilities for radioactive waste, IAEA Specific Safety Guide, SSG-14, Vienna (2011).
- The Safety Case and Safety Assessment for the Disposal of Radioactive Waste, IAEA Specific Safety Guide, SSG-23, Vienna (2012).
- Periodic Safety Review for Nuclear Power Plants, IAEA Specific Safety Guide, SSG-25, Vienna (2013).
- Near Surface Disposal of Radioactive Waste, IAEA Specific Safety Guide, SSG-29, Vienna (2014).
- Monitoring and Surveillance of Radioactive Waste Disposal Facilities, IAEA Specific Safety Guide, SSG-31, Vienna (2014).
- Safety of Nuclear Fuel Cycle Facilities, IAEA Specific Safety Requirements, (SSR-4, Vienna (2017).
- Leadership, Management and Culture for Safety in Radioactive Waste Management, IAEA General Safety Guide, GSG-16, Vienna (2022).

Other international/European standards and recommendations relevant for disposal of spent fuel and radioactive waste:

- Joint convention on the safety of spent fuel management and on the safety of radioactive waste management. INFCIRC/546. 24 December 1997.
- 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
- 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
- WENRA - Waste and Spent Fuel Storage Safety Reference Levels report, version 2.3
- WENRA - Decommissioning Safety Reference Levels Report, version 2.3.
- WENRA – Radioactive Waste Treatment and Conditioning Safety Levels report, version 1.2
- The Nature and Purpose of the Post-closure Safety Cases for Geological Repositories, OECD/NEA (2013)
- Post-closure Safety Case for Geological Repositories, OECD/NEA (2004)

Part 2
Radioactive Waste Disposal Safety Reference Levels

These reference levels are intended for disposal facilities which will be used to dispose of radioactive waste in solid form.

The reference levels apply to a wide range of facilities and thus have to be applied in a proportionate manner, taking account of the magnitude of the potential hazard of the waste to be disposed of. Such a graded approach should also be applied within a particular facility, so that the provisions made and means of implementation within the facility are proportionate to the hazards identified by the licensee.

Whatever the type of waste to be disposed of, disposal systems should incorporate passive safety features as far as reasonably practical and their post-closure safety, possibly after a period of surveillance, should only rely on passive means.

Compared to other nuclear facilities, radioactive waste disposal facilities present a unique challenge because of the need to demonstrate safety over long periods after closure. Depending on the radiological hazard presented by the waste and the type of facility, these periods may span a few hundred years (for short-lived waste) to several hundred thousand years or more (for long-lived waste). Consideration of radiological hazard over long time periods requires a special focus on post-closure safety.

Containment and isolation are two major safety objectives that have to be fulfilled by the disposal system. Post-closure safety often relies primarily on the intrinsic properties of the site, mainly the ability of the host environment to prevent or delay the release of radionuclides, although any engineered barriers will also contribute to a greater or lesser extent depending on the facility design and construction. Developing the safety case for a disposal system is an important challenge; it requires demonstrating that an acceptable level of safety will be provided over an appropriate timescale. It requires an adequate understanding of the behaviour of the disposal system, in order to achieve confidence in the safety demonstration. The safety demonstration needs to take account of uncertainties in the possible evolution of the disposal system and consider, among other things, reasonably foreseeable events and processes that may disturb the disposal system.

The safety case for a disposal facility in its geological environment presents specific problems compared to the safety case for other types of nuclear facilities: first, it has to address post-closure safety in conjunction with operational safety; second, the safety case matures in the

time period during which the disposal concept is developed and the facility is constructed and operated; third, the safety case will have to deal with uncertainties, particularly in the very long term, that have no parallels in other types of facility. The safety case for a disposal facility will often relate to a given stage of facility development.

It is generally recognised that there are key phases that cover the development and implementation of a disposal facility. However, the exact definition of the phases and decision-making points may differ among national programmes. As an example, according to the IAEA SSR-5, the following phases can be considered (see Appendix 1):

- The pre-operational phase during which a prospective licensee considers potential sites and design options. A decision regarding the siting of the disposal facility is taken (the prospective licensee will beforehand have identified potentially suitable sites that are compatible with the design concept), the authorization for design and construction of the disposal facility is granted, and design and construction work proceeds.
- The operational phase, during which the licensee emplaces waste packages in the disposal facility. The operational phase begins when waste is first received at the facility. Operations to close parts of the disposal facility are also likely to take place during this phase in parallel with waste emplacement.
- At the end of the operational phase, the licensee will be authorized to decommission parts of the disposal facility that are not needed after closure and to close the disposal facility fully and will proceed to closure.
- The post-closure phase which begins at the time when all the engineered containment and isolation features have been put in place. Follow-up provisions, to reflect the requirements of the post-closure safety case, will be implemented as appropriate.

Consideration should also be given to development of the disposal facility over time. It is possible that construction activities and decommissioning or closure of parts of the facility might take place while it is still in operation. Due attention must be paid to the safe management of any such concurrent activities.

The development of the safety case in parallel with the development of the disposal facility needs to be recognised as an iterative process in which it is strongly recommended that the regulatory body should be involved even prior to licensing. During this pre-licensing phase, it is very important that a dialogue between the prospective licensee of the disposal facility and the regulatory body (and its technical support organization, if any) should take place. The prospective licensee and the regulatory body will both be concerned to ensure that the project is in line with regulatory expectations. At some key decision steps, the regulatory body may even be expected to make a preliminary review of pre-licensing documentation and to formulate safety recommendations. In some cases, the regulator might be called upon to provide information to the public so as to contribute to better understanding of the safety issues and transparency of the regulatory assessment process. During any pre-licensing process, the regulatory body should be very careful to maintain regulatory independence by

not contributing to developing the concept and the design of the facility, and by making sure that the responsibility for the project is seen to lie with the prospective licensee.

Even before a disposal facility exists, the prospective licensee of the facility will be expected to develop a safety strategy including the principle of optimization of protection and a management system to ensure that the activities conducted in preparation for the licence application are undertaken under a quality assurance system and are traceable. As an example, it is very important that when research and development activities are conducted in support of the safety case, it can be demonstrated that they have been conducted according to a well-defined and structured programme, oriented toward safety demonstration.

Depending on the regulatory requirements the complete description of the management system may or may not be part of the safety case. The regulatory body will have to make sure that the licensee maintains appropriate and adequate means, resources and organizational arrangements throughout the project to develop and maintain the safety case and to ensure the safety of operations.

From the early stages in the development of a disposal facility, both operational safety and post-closure safety will need to be addressed in the safety case. As part of an iterative process, the safety case will evolve and mature, throughout the disposal facility lifetime, as new information and results become available from research, site characterization, and safety assessments.

The safety case may also evolve based on the experience gained during construction and operation as well as implementation of the optimization process. When a modified design for part of the facility is envisaged, experience feedback from previous stages has to be taken into account, as well as experience feedback from other facilities and any evolution in techniques and technologies.

The typical content of a safety case is given in Appendix 3.

At the earliest stages of a disposal facility, there may be many unresolved questions and uncertainties. The safety case should identify key assumptions and associated uncertainties that may influence safety and the actions needed to manage them, especially with regard to the R&D programmes. By the time a licence for constructing the disposal facility is applied for, any uncertainties and open questions that might undermine safety should have been addressed adequately to support the necessary regulatory decisions. At each stage in the development of a facility when a regulatory decision to proceed is required, the key assumptions with associated uncertainties should have been addressed to an extent sufficient to establish confidence in the decision.

The licensee will have to pay attention to maintaining knowledge and enabling appropriate transfer of that knowledge throughout the project. Record keeping of important information and data about the disposal facility and its geological environment is an important

requirement for the facility that needs to be taken into account by the licensee from the beginning of the project.

Depending on the type of waste and the disposal concept, the characteristics of the waste packages may vary. Some waste packages may be designed only with the aim of allowing handling and emplacing waste in the disposal facility while others will contribute to the safety functions of the disposal system, for example, with respect to containment and isolation.

2.1
Safety area: Safety management

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2.1.1 Safety issue: Responsibility

DI-01:
The licensee shall have the responsibility for ensuring and demonstrating that the facility is safe until termination of the licence, and for demonstrating that the facility will continue to be safe thereafter.

*Related **IAEA** safety standards:*

The operator of a disposal facility for radioactive waste shall be responsible for its safety. The operator shall carry out safety assessment and develop and maintain a safety case, and shall carry out all the necessary activities for site selection and evaluation, design, construction, operation, closure and, if necessary, surveillance after closure, in accordance with national strategy, in compliance with the regulatory requirements and within the legal and regulatory infrastructure. (SSR-5, Requirement 3)

DI-02:
The licensee shall make and implement programmes and procedures necessary to maintain safety.

*Related **IAEA** safety standards:*

The operating organization shall establish and implement safety, health and environmental policies that give protection and safety the overriding priority warranted by their significance. (SSR-4, Requirement 3)

Processes and activities shall be developed and shall be effectively managed to achieve the organization's goals without compromising safety. (GSR Part 2, Requirement 10)

DI-03*:*
The licensee shall continuously improve safety by, in particular, using experience feedback and advances in science and technology.

*Related **IAEA** safety standards:*

[...] The feedback of operating experience from facilities and activities — and, where relevant, from elsewhere — is a key means of enhancing safety. Processes must be put in place for the feedback and analysis of operating experience, including initiating events, accident precursors, near misses, accidents and unauthorized acts, so that lessons may be learned, shared and acted upon. (SF-1, para 3.17)

All processes shall be regularly evaluated for their effectiveness and for their ability to ensure safety. (GSR Part 2, para 6.2)

DI-04:

The licensee shall establish and implement its safety policy taking due account of national and international standards and ensure that matters related to safety are given the highest priority.

*Related **IAEA** safety standards:*

The operating organization shall establish and implement safety, health and environmental policies that give protection and safety the overriding priority warranted by their significance. (SSR-4, Requirement 3)

DI-05:

The licensee shall ensure that the resources (including organisational structure, individuals, experience and skills, infrastructure, working environment, information and knowledge, suppliers, materials) for all necessary activities before termination of the licence will be available at the time they are needed.

*Related **IAEA** safety standards:*

Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them. (GSR Part 2, Requirement 9)

DI-06:

After closure and until termination of the licence, the licensee shall remain responsible for surveillance of the disposal system in accordance with the safety case and for any remedial action that might be required.

*Related **IAEA** safety standards:*

The operator of a disposal facility for radioactive waste shall be responsible for its safety. The operator shall carry out safety assessment and develop and maintain a safety case, and shall carry out all the necessary activities for site selection and evaluation, design, construction, operation, closure and, if necessary, surveillance after closure, in accordance with national strategy, in compliance with the regulatory requirements and within the legal and regulatory infrastructure. (SSR-5, Requirement 3)

DI-07:

The licensee shall ensure that all activities, including those carried out by contractors, are performed and controlled according to the licensee's management system.

*Related **IAEA** safety standards:*

The requirements established in this Safety Requirements publication are intended for use in the following ways:
[…]

(b) By the registrant or licensee, to specify to a vendor or supplier of products and equipment, or a contractor for services, and to any other relevant organization, any requirements that must be met by the vendor's or supplier's management system;
[…]
(GSR Part 2, para 1.7)

DI-08:

The licensee shall ensure that interfaces between its responsibilities and those of other organisations are clearly defined, agreed and documented.

*Related **IAEA** safety standards:*

Interdependences among all steps in the predisposal management of radioactive waste, as well as the impact of the anticipated disposal option, shall be appropriately taken into account. (GSR Part 5, Requirement 6)

The operator is responsible for establishing and implementing the overall strategy for the management of the waste that is generated, […], taking into account interdependences among all steps in waste management, the available options and the national radioactive waste management policy.
(GSR Part 5, para 3.17)

2.1.2 Safety issue: Organizational structure

DI-09:

The licensee shall establish an organizational structure to enable its safety policy to be implemented with a clear definition of responsibilities, lines of authority and communication.

*Related **IAEA** safety standards:*

The structure of the operating organization and the functions, roles and responsibilities of its personnel shall be established and documented, in accordance with a graded approach. (SSR-4, Requirement 55)

Functional responsibilities, lines of authority, and lines of internal and external communication for the safety of operations in all facility states shall be clearly specified in writing. The functions and responsibilities of the key positions within the operating organization shall be established. In particular, the operating organization shall clearly establish lines of authority and arrangements for communications between senior management of the facility, the safety committee(s)43, nuclear criticality safety staff, radiation protection personnel, groups responsible for maintenance, modification and engineering, and the personnel responsible for establishing and applying the management system. (SSR-4, para 9.9)

DI-10:

The licensee shall establish the capability in terms of staffing, skills, experience and knowledge to build and maintain the competences required to undertake all relevant activities and adapt its organization progressively in accordance with future plans.

*Related **IAEA** safety standards:*

Senior management shall make arrangements to ensure that the organization has in-house, or maintains access to, the full range of competences and the resources necessary to conduct its activities and to discharge its responsibilities for ensuring safety at each stage in the lifetime of the facility or activity, and during an emergency response […]. (GSR Part 2, para 4.21)

Senior management shall determine which competences and resources the organization has to retain or has to develop internally, and which competences and resources may be obtained externally, for ensuring safety. (GSR Part 2, para 4.22)

DI-11:

The licensee shall define the necessary qualification, experience and skills for all staff involved with activities that may affect safety.

*Related **IAEA** safety standards:*

Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them. (GSR Part 2, Requirement 9)

Senior management shall ensure that competence requirements for individuals at all levels are specified and shall ensure that training is conducted, or other actions are taken, to achieve and to sustain the required levels of competence. An evaluation shall be conducted of the effectiveness of the training and of the actions taken. (GSR Part 2, para 4.23)

DI-12:

The licensee shall establish training programmes to develop and maintain the professional skills of its staff, and to ensure that personnel are appropriately trained before beginning each activity.

*Related **IAEA** safety standards:*

A suitable training and retraining programme shall be established and maintained for the operating personnel. The training programme shall include provision for periodic confirmation of the competence of personnel and for refresher training on a regular basis. The refresher training shall also include retraining provision for personnel who have had extended absences from their authorized duties. (SSR-4, para 9-40).

DI-13:

Where any activity related to safety is carried out by a contractor, the licensee shall retain within its organisation the capability to assess the adequacy of the contractor's resources and skills for ensuring safety and the quality of the deliverables.

*Related **IAEA** safety standards:*

The organization shall put in place arrangements with vendors, contractors and suppliers for specifying, monitoring and managing the supply to it of items, products and services that may influence safety. (SSR-4, Requirement 11)

The organization shall have a clear understanding and knowledge of the product or service being supplied. The organization shall itself retain the competence to specify the scope and standard of a required product or service, and subsequently to assess whether the product or service supplied meets the applicable safety requirements. (SSR-4, para 4.34)

2.1.3 Safety issue: Management system

DI-14:

The licensee shall establish, document, implement, assess and continuously improve its management system to achieve and enhance safety by bringing together in a coherent manner all the requirements for managing the organization by:

- Describing and implementing the planned and systematic actions necessary to provide adequate confidence that all these requirements are satisfied;
- Ensuring that health, environmental, security, quality and economic requirements are not considered separately from safety requirements, to help preclude their possible negative impact on safety;
- Promoting the development of a safety culture, which includes individual and collective commitment to safety and encourages a proactive, questioning and learning attitude at all levels in the organisation;
- Ensuring that the work performed in each process is carried out using approved procedures, instructions, drawings or other appropriate means that are periodically reviewed to ensure their adequacy and effectiveness, and is subject to quality arrangements appropriate to a graded approach.

*Related **IAEA** safety standards:*

The operating organization shall establish and apply a single coherent management system in which all the constituents of the organization, including its structure, resources and processes, are integrated to enable the organization's objectives to be achieved. The requirements for an integrated management system for facilities and activities are established in GSR Part 2 [4]. These requirements and the associated objectives and principles shall be taken into account in the development and implementation of the management system for a nuclear fuel cycle facility on the basis of the importance to safety of each item, service or process. The extent of development and application of the management system shall be determined in accordance with a graded approach for a particular nuclear fuel cycle facility. (SSR-4, para 4.8)

The management system shall be applied to achieve goals safely, to enhance safety and to foster a strong safety culture by:

(a) Bringing together in a coherent manner all the necessary elements for safely managing the organization and its activities;

(b) Describing the arrangements made for management of the organization and its activities;

(c) Describing the planned and systematic actions necessary to provide confidence that all requirements are met;

(d) Ensuring that safety is taken into account in decision making and is not compromised by any decisions taken.

(GSR Part 2, para 4.9)

DI-15:

The licensee shall ensure that its management system covers normal operation conditions, anticipated operational occurrences and possible accidents.

*Related **IAEA** safety standards:*

For a disposal facility, as for any other operational nuclear facility or facility where radioactive material is handled, used, stored or processed, an operational radiation protection programme, commensurate with the radiological hazards, is required to be put in place to ensure that doses to workers during normal operations are controlled and that the requirements for the limitation of radiation doses are met. […] . In addition, emergency plans are required to be put in place for dealing with accidents and other incidents, and for ensuring that any consequent radiation doses are controlled to the extent possible, with due regard for the relevant emergency action levels.(SSR-5, para 2.13)

DI-16:

The licensee shall ensure that its management system takes into account safety in design, construction, commissioning operation, decommissioning, closure and after closure. The licensee shall review its management system at regular intervals to ensure continuing suitability and effectiveness.

*Related **IAEA** safety standards:*

Management systems to provide for assurance of quality shall be applied to all safety related activities, systems and components throughout all the steps of the development and operation of a disposal facility. The level of assurance for each element shall be commensurate with its importance to safety. (SSR-5, Requirement 25)

Senior management shall conduct a review of the management system at planned intervals to confirm its suitability and effectiveness, and its ability to enable the objectives of the organization to be accomplished, with account taken of new requirements and changes in the organization.
(GSR para 2, para 6.6)

DI-17:

The licensee shall document in its management system at least the following:

- Its safety policy;
- A description of its management system;
- A description of its organisational structure;
- A description of the functional responsibilities, accountabilities, levels of authority and interactions of those managing, performing and assessing work;
- A description of the licensee's interactions with contractors, including the control of activities carried out by contractors;
- A description of the processes and supporting information that explain how work is to be prepared, carried out, recorded, assessed, reviewed, and improved;

- A description of the provisions to record and review knowledge, information and data about all aspects related to safety of the disposal facility and system and to preserve the records;
- A description of the provisions to ensure appropriate transfer of knowledge to its personnel throughout the different phases until termination of the licence.

*Related **IAEA** safety standards:*

The documentation of the management system shall include as a minimum: policy statements of the organization on values and behavioural expectations; the fundamental safety objective; a description of the organization and its structure; a description of the responsibilities and accountabilities; the levels of authority, including all interactions of those managing, performing and assessing work and including all processes; a description of how the management system complies with regulatory requirements that apply to the organization; and a description of the interactions with external organizations and with interested parties. (GSR Part 2, para 4.16)

Each process shall be developed and shall be managed to ensure that requirements are met without compromising safety. Processes shall be documented and the necessary supporting documentation shall be maintained. It shall be ensured that process documentation is consistent with any existing documents of the organization. Records to demonstrate that the results of the respective process have been achieved shall be specified in the process documentation. (GSR Part 2, para 4.28)

2.1.4 Safety issue: Record keeping

DI-18:

The licensee shall ensure that, for any operational activity relating to safety, all documents required to demonstrate that it will be undertaken safely (e.g.: operational procedures, operating instructions) have been prepared before beginning that activity.

*Related **IAEA** safety standards:*

Each process or activity that could have implications for safety shall be carried out under controlled conditions, by means of following readily understood, approved and current procedures, instructions and drawings. These procedures, instructions and drawings shall be validated before their first use and shall be periodically reviewed to ensure their adequacy and effectiveness. Individuals carrying out such activities shall be involved in the validation and the periodic review of such procedures, instructions and drawings. GSR Part 2, para 4.32

DI-19:

The licensee shall establish and conduct an experience feedback programme to collect, screen, analyse and document in a systematic way experience important to safety in all phases of facility development until termination of the licence. This programme shall cover issues of importance for both operational and post-closure safety. This information shall be used for preventing events and processes adverse to safety, and for improving the design or

manner of construction and operation of the facility as necessary. Experience from other facilities shall also be considered as appropriate.

*Related **IAEA** safety standards:*

[…] The feedback of operating experience from facilities and activities — and, where relevant, from elsewhere — is a key means of enhancing safety. Processes must be put in place for the feedback and analysis of operating experience, including initiating events, accident precursors, near misses, accidents and unauthorized acts, so that lessons may be learned, shared and acted upon. (SF-1, para 3.17)

The operating organization shall report, collect, screen, analyse, trend, document and communicate operating experience at the facility in a systematic way. It shall obtain and evaluate available information on relevant operating experience at other nuclear installations to draw on and shall incorporate lessons for its own operations, including its emergency arrangements. It shall also encourage the exchange of experience within national and international systems for the feedback of operating experience. These activities shall be performed in accordance with the management system. (SSR-4, para 9.133).

2.1.5 Safety issue: Records and knowledge keeping

DI-20:

The licensee shall ensure that, during design, construction, commissioning, operation, closure and post-closure until termination of the licence, knowledge and records important to safety are available and updated as appropriate for current activities, safety assessment and long term record keeping on:

- Characterisation of the site
- Design basis
- Design
- As built construction of the disposal facility
- Operation including any operational occurrences and accidents
- Inventory and emplacement of the waste
- State of the disposal system after closure
- All documents relating to the safety case

*Related **IAEA** safety standards:*

The operator has to retain all the information relevant to the safety case and the supporting safety assessment for the disposal facility and has to retain the inspection records that demonstrate compliance with regulatory requirements and with the operator's own specification. Such information and records have to be retained, at least up until the time when the information is shown to be superseded, or until responsibility for the disposal facility is passed on to another organization. This occurs, for example, at closure of the facility, when all relevant information and records have to be transferred to the organization assuming responsibility for the facility and its safety. (SSR-5, para 3.15)

DI-21:

The licensee shall ensure that, at termination of the licence, records on the site and on the as-

closed state of the disposal facility are available for continuing preservation, in accordance with the national legal and regulatory framework.

*Related **IAEA** safety standards:*

Disposal facilities may not be closed for several tens of years or more after operations have commenced. Plans for possible future controls and the period over which they would be applied may initially be flexible and conceptual in nature, but plans have to be developed and refined as the facility approaches closure. […] Arrangements have to be made to be able to pass on information about the disposal facility and its contents to future generations to enable any future decisions on the disposal facility and its safety to be made. (SSR-5, para 5.13)

2.2
Safety area: Disposal facility development

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2.2.1 Safety issue: General requirements

DI-22:
The licensee shall design, construct, operate and decommission a disposal facility, ensure closure and, as appropriate, carry out post-closure surveillance so as to fulfil the objective of protecting people and the environment according to applicable radiological protection criteria, including the ALARA principle. A graded approach shall be adopted proportionate to the hazard presented by the waste.

*Related **IAEA** safety standards:*

The operator of a disposal facility for radioactive waste shall be responsible for its safety. The operator shall carry out safety assessment and develop and maintain a safety case, and shall carry out all the necessary activities for site selection and evaluation, design, construction, operation, closure and, if necessary, surveillance after closure, in accordance with national strategy, in compliance with the regulatory requirements and within the legal and regulatory infrastructure. (SSR-5, Requirement 3)

The safety measures that are applied to facilities and activities that give rise to radiation risks are considered optimized if they provide the highest level of safety that can reasonably be achieved throughout the lifetime of the facility or activity, without unduly limiting its utilization. (SF-1, para 3.21)

To determine whether radiation risks are as low as reasonably achievable, all such risks, whether arising from normal operations or from abnormal or accident conditions, must be assessed (using a graded approach) a priori and periodically reassessed throughout the lifetime of facilities and activities. Where there are interdependences between related actions or between their associated risks (e.g. for different stages of the lifetime of facilities and activities, for risks to different groups or for different steps in radioactive waste management), these must also be considered. Account also has to be taken of uncertainties in knowledge. (SF-1, para 3.22)

A graded approach has to be adopted, depending on the hazard potential of the waste and the complexity of the site and disposal facility design [...] (SSR-5, para 4.28)

DI-23:
The licensee shall ensure that safety is provided by means of multiple safety functions, including use of multiple barriers and controls. The performance of these barriers shall be achieved by diverse physical and chemical means. The overall performance of the disposal

system shall not be unduly dependent on any single safety function according to the defence in depth principle.

*Related **IAEA** safety standards:*

The host environment shall be selected, the engineered barriers of the disposal facility shall be designed and the facility shall be operated to ensure that safety is provided by means of multiple safety functions. Containment and isolation of the waste shall be provided by means of a number of physical barriers of the disposal system. The performance of these physical barriers shall be achieved by means of diverse physical and chemical processes together with various operational controls. The capability of the individual barriers and controls together with that of the overall disposal system to perform as assumed in the safety case shall be demonstrated. The overall performance of the disposal system shall not be unduly dependent on a single safety function. (SSR-5, Requirement 7)

Requirements are established […] for ensuring that there is adequate defence in depth so that safety is not unduly dependent on a single element of the disposal facility such as the waste package, or a control measure such as verification of the inventory of waste packages or the fulfilment of a single safety function, such as by containment of radionuclides or retardation of migration; or an administrative procedure such as a procedure for site access control or for maintenance of the facility (SSR-5, para 3.33)

DI-24:

The licensee shall ensure that safety will be achieved entirely by passive means, after closure of the facility and after any subsequent period of active institutional control.

*Related **IAEA** safety standards:*

The operator shall evaluate the site and shall design, construct, operate and close the disposal facility in such a way that safety is ensured by passive means to the fullest extent possible and the need for actions to be taken after closure of the facility is minimized. (SSR-5, Requirement 5)

DI-25:

Throughout the process of development (e.g. design, construction commissioning), operation, decommissioning and closure of a disposal facility, the licensee shall aim for an optimized level of safety considering both operational and the post-closure phases.

*Related **IAEA** safety standards:*

Throughout the process of development and operation of a disposal facility for radioactive waste, an understanding of the relevance and the implications for safety of the available options for the facility shall be developed by the operator. This is for the purpose of providing an optimized level of safety in the operational stage and after closure. (SSR-5, Requirement 4)

DI-26:

The licensee shall design, construct, operate, decommission and close the disposal facility in order to establish a disposal system which provides containment and isolation of the waste for a period of time suited to its radiological hazards.

*Related **IAEA** safety standards:*

The engineered barriers, including the waste form and packaging, shall be designed, and the host environment shall be selected, so as to provide containment of the radionuclides associated with the waste. Containment shall be provided until radioactive decay has significantly reduced the hazard posed by the waste. In addition, in the case of heat generating waste, containment shall be provided while the waste is still producing heat energy in amounts that could adversely affect the performance of the disposal system. (SSR-5, Requirement 8)

The disposal facility shall be sited, designed and operated to provide features that are aimed at isolation of the radioactive waste from people and from the accessible biosphere. The features shall aim to provide isolation for several hundreds of years for short lived waste and at least several thousand years for intermediate and high level waste. In so doing, consideration shall be given to both the natural evolution of the disposal system and events causing disturbance of the facility. (SSR-5, Requirement 9)

DI-27:

The licensee shall ensure that the disposal system provides isolation and containment during normal evolution and shall establish to a high level of confidence that the disposal system can be relied on to provide isolation and containment over the timescales necessary.

*Related **IAEA** safety standards:*

The engineered barriers, including the waste form and packaging, shall be designed, and the host environment shall be selected, so as to provide containment of the radionuclides associated with the waste. Containment shall be provided until radioactive decay has significantly reduced the hazard posed by the waste. […] (SSR-5, Requirement 8)

The disposal facility shall be sited, designed and operated to provide features that are aimed at isolation of the radioactive waste from people and from the accessible biosphere. […] In so doing, consideration shall be given to both the natural evolution of the disposal system and events causing disturbance of the facility. (SSR-5, Requirement 9)

The concept of robustness may be applied to individual components of the disposal system, to the disposal system as a whole and to safety assessment. (SSG-23, para 6.38)

[…]. The assessment of the robustness of a disposal system relies on several elements:

- *Demonstration of the robustness of individual barriers and their safety functions;*
- *Evaluation of the concept of defence in depth, i.e. the presence of multiple diverse safety functions, to ensure that the overall performance of the disposal system does not rely on a single safety function, the failure or unexpected poor performance of which would lead to unacceptable radiological consequences (see paras 6.29–6.37);*
- *Verification that good engineering practices (demonstrability and feasibility) have been applied;*
- *Demonstration that safety is achieved through passive means.*

(SSG-23, para 6.40)

DI-28:

The licensee shall ensure that any provisions to facilitate reversal of disposal operations, or retrieval of waste packages disposed of, have no unacceptable effects on post-closure safety.

*Related **IAEA** safety standards:*

[…] No relaxation of safety standards or requirements could be allowed on the grounds that waste retrieval may be possible or may be facilitated by a particular provision. It would have to be ensured that any such provision would not have an unacceptable adverse effect on safety or on the performance of the disposal system. (SSR-5, para 1.25)

DI-29:

The licensee shall define and implement an appropriate programme (e.g., through R&D, investigations, modelling, testing and monitoring activities) with the purpose of providing an understanding of the evolution of the disposal system adequate for the safety case.

*Related **IAEA** safety standards:*

Throughout the process of development and operation of a disposal facility for radioactive waste, an understanding of the relevance and the implications for safety of the available options for the facility shall be developed by the operator. […] (SSR-5, Requirement 4)

A programme of monitoring shall be carried out prior to, and during, the construction and operation of a disposal facility and after its closure, if this is part of the safety case. This programme shall be designed to collect and update information necessary for the purposes of protection and safety. […] Monitoring shall also be carried out to confirm the absence of any conditions that could affect the safety of the facility after closure. (SSR-5, Requirement 21)

The operator has to conduct or commission the research and development work necessary to ensure that the planned technical operations can be practically and safely accomplished, and to demonstrate this. The operator likewise has to conduct or commission the research work necessary to investigate, to understand and to support the understanding of the processes on which the safety of the disposal facility depends. The operator also has to carry out all the necessary investigations of sites and of materials and has to assess their suitability and obtain all the data necessary for the purposes of safety assessment. (SSR-5, para 3.13)

DI-30:

If construction, operation, decommissioning or closure activities take place concurrently, the licensee shall perform the works so that they will not have an unacceptable effect on operational or post-closure safety.

*Related **IAEA** safety standards:*

Excavation and construction of a disposal facility could continue after the commencement of operation of part of the facility and after the emplacement of waste packages. Such overlapping of construction and operational activities has to be planned and carried out so as to ensure safety, both in operation and after closure. (SSR-5, para 4.34)

DI-31:

The licensee shall ensure that any measures necessary for the purpose of accounting for and control of nuclear material shall not unacceptably affect operational and post-closure safety.

*Related **IAEA** safety standards:*

In the design and operation of disposal facilities subject to agreements on accounting for, and control of, nuclear material, consideration shall be given to ensuring that safety is not compromised by the measures required under the system of accounting for, and control of, nuclear material. (SSR-5, Requirement 23)

2.2.2 Safety issue: Site characterization

DI-32:

The licensee shall prepare and implement a programme for site characterization of the selected site. The programme shall provide the information necessary to support the safety case.

*Related **IAEA** safety standards:*

An understanding of the site for a disposal facility has to be gained in order to present a convincing scientific description of the disposal system on which the more conceptual descriptions that are used in the safety assessment can be based [...]. (SSR-5, para 4.26)

A detailed programme of site characterization should be carried out to provide the site specific data necessary to support the technical basis for safety assessments of the long term isolation and containment of the waste within the excavated portion of the geological disposal facility. […] (SSG-14, para 6.9)

DI-33:

The licensee shall conduct site characterisation of the selected site:

- To establish baseline conditions for the site and the environment;
- To support the understanding of the normal evolution;
- To identify any events and processes associated with the site that might disturb the normal evolution of the disposal system;
- To support the understanding of the effect on safety of any features, events and processes associated with the disposal system.

*Related **IAEA** safety standards:*

The site for a disposal facility shall be characterized at a level of detail sufficient to support a general understanding of both the characteristics of the site and how the site will evolve over time .This shall include its present condition, its probable natural evolution and possible natural events, and also human plans and actions in the vicinity that may affect the safety of the facility over the period of interest. It shall also include a specific understanding of the impact on safety of features, events and processes associated with the site and the facility. (SSR-5, Requirement 15)

2.2.3 Safety issue: Design

DI-34:

The licensee shall design the disposal facility to establish a disposal system which provides operational and post-closure safety. The licensee shall take into account the characteristics of the wastes to be disposed of (e.g.: radioactivity, heat and gas generation), the feasibility of the technical options and the characteristics of the selected site.

*Related **IAEA** safety standards:*

The disposal facility and its engineered barriers shall be designed to contain the waste with its associated hazard, to be physically and chemically compatible with the host geological formation and/or surface environment, and to provide safety features after closure that complement those features afforded by the host environment. The facility and its engineered barriers shall be designed to provide safety during the operational period. (SSR-5, Requirement 16)

DI-35:

The licensee shall establish a design basis for the facility taking into account normal operational conditions, anticipated operational occurrences and possible accidents derived from a relevant set of postulated initiating events (PIEs).

*Related **IAEA** safety standards:*

A comprehensive safety analysis shall be carried out in the design process for a nuclear fuel cycle facility. Systematic and recognized methods of deterministic analysis shall be used, complemented by probabilistic assessments where appropriate, in accordance with a graded approach. The purpose of the analysis shall be to ensure that the design provides an adequate level of safety and meets the required design acceptance criteria. (SSR-4, Requirement 20)

Design criteria corresponding to relevant physical parameters shall be specified for each operational state of the facility and for each design basis accident or equivalent. Engineering design rules shall be applied to provide for safety margins such that no significant consequences would occur even if the operational limits were exceeded within these margins. (SSR-4, Requirement 17)

DI-36:

The licensee shall design the disposal facility giving due consideration to both normal evolution of the disposal system after closure and scenarios involving events and processes that might disturb the normal evolution of the disposal system.

*Related **IAEA** safety standards:*

The post-closure safety case should specify a range of credible scenarios for the evolution of the disposal facility and its surroundings over the time period for which the waste represents a potentially significant hazard or as specified in national regulations, some of which prescribe the timescale for the assessment. Consideration should be given to expected scenarios (normal evolution scenarios) and to less likely scenarios.(SSG-29, para 5.18)

DI-37:

The licensee shall design the disposal facility giving due consideration to disturbances of the disposal system during operation whose consequences may affect post-closure safety.

*Related **IAEA** safety standards:*

With regard to safety after closure, the expected range of possible developments affecting the disposal system and events that might affect its performance, including those of low probability, have to be considered in the safety case and supporting assessment by the following means:

(a) By presenting evidence that the disposal system, its possible evolutions and events that might affect it are sufficiently well understood;
(b) By demonstrating the feasibility of implementing the design;
(c) By providing convincing estimates of the performance of the disposal system and a reasonable level of assurance that all the relevant safety requirements will be complied with and that radiation protection has been optimized;
(d) By identifying and presenting an analysis of the associated uncertainties.

(SSR-5, para 4.17)

[…] consideration has to be given to both occupational exposure and public exposure resulting from conditions of normal operation and anticipated operational occurrences over the operating lifetime of the disposal facility. Similarly, consideration also has to be given to accidents with the potential for significant radiological consequences with regard to both the likelihood of occurrence and the magnitude of possible radiation doses. […] (SSG-29, para 5.17)

DI-38:

The licensee shall design the disposal facility to fulfil the following safety functions during the operational and post-closure phases:

- Control of the exposure of people and the environment;
- Containment and isolation of radioactive material;
- Control of sub-criticality, if applicable; If burnup credit is adopted for criticality management, the licensee shall confirm compliance with the limiting minimum burnup level with respect to initial enrichment by administrative and operational controls;
- Heat or gas removal, if applicable.

*Related **IAEA** safety standards:*

The engineered barriers, including the waste form and packaging, shall be designed, and the host environment shall be selected, so as to provide containment of the radionuclides associated with the waste. Containment shall be provided until radioactive decay has significantly reduced the hazard posed by the waste. In addition, in the case of heat generating waste, containment shall be provided while the waste is still producing heat energy in amounts that could adversely affect the performance of the disposal system. (SSR-5, Requirement 8)

Fissile material, when present, has to be managed and has to be emplaced in the disposal facility in a configuration that will remain subcritical. This may be achieved by various means, including the appropriate distribution of fissile material during the conditioning of the waste and the proper design of the waste packages [...]. (SSR-5, para 4.37)

DI-39:

The licensee shall identify and classify engineered structures, systems and components (SSCs) in accordance with their importance for operational and post-closure safety.

*Related **IAEA** safety standards:*

It shall be determined in the safety assessment whether a suitable safety classification scheme has been formulated and applied to structures, systems and components. It shall be determined whether the safety classification scheme adequately reflects the importance to safety of structures, systems and components, the severity of the consequences of their failure, the requirement for them to be available in anticipated operational occurrences and accident conditions, and the need for them to be adequately qualified. (GSR Part 4, para 4.30)

DI-40:

The licensee shall base the design of the facility on applicable standards, appropriately proven techniques and the use of appropriate materials to ensure that the safety requirements will be met, throughout operation and post-closure.

*Related **IAEA** safety standards:*

The safety case should address how principles of good engineering practice have been applied in the design of the facility, and the operator should demonstrate in the safety case that the materials and construction techniques foreseen for the disposal facility are well understood, and that knowledge gained from similar applications confirms that these materials are well suited for the intended use. Wherever possible, the operator should make use of well established construction techniques and should give due consideration to feedback from experience gained in the use of these techniques. (SSG-23, para 4.53)

DI-41:

The licensee shall have a process for identifying any conflicting design requirements from different regulatory regimes, and seeking to resolve them.

*Related **IAEA** safety standards:*

The operating organization shall identify the criteria, codes and standards applicable to items important to safety and shall justify their use, using a graded approach. Typical areas covered by codes and standards include structural, mechanical and electrical design, criticality safety and fire protection. In particular, if different criteria, codes and standards are used for different aspects of the same item or system, consistency between them shall be demonstrated. Where required, the selection of design codes shall be subject to review by the regulatory body. (SSR-4, para 6.55)

DI-42:

The licensee shall design the disposal facility so that the engineered components (including

barriers) are, to an adequate extent, physically and chemically compatible with each other, with the waste disposed of and with the host environment.

*Related **IAEA** safety standards:*

The disposal facility and its engineered barriers shall be designed to contain the waste with its associated hazard, to be physically and chemically compatible with the host geological formation and/or surface environment, and to provide safety features after closure that complement those features afforded by the host environment. The facility and its engineered barriers shall be designed to provide safety during the operational period. (SSR-5, Requirement 16)

DI-43:

The licensee shall make design provisions for maintenance, testing, inspection and monitoring of structures, systems and components (SSCs), addressing also their ageing.

*Related **IAEA** safety standards:*

Items important to safety shall be designed to facilitate maintenance, inspection and testing for their functional capability over the lifetime of the facility. (SSR-4, Requirement 26)

DI-44:

The licensee shall establish design provisions for monitoring the host environment.

*Related **IAEA** safety standards:*

A programme of monitoring shall be carried out prior to, and during, the construction and operation of a disposal facility and after its closure, if this is part of the safety case. This programme shall be designed to collect and update information necessary for the purposes of protection and safety. Information shall be obtained to confirm the conditions necessary for the safety of workers and members of the public and protection of the environment during the period of operation of the facility. Monitoring shall also be carried out to confirm the absence of any conditions that could affect the safety of the facility after closure. (SSR-5, Requirement 21)

DI-45:

The licensee shall incorporate passive safety features for operational safety into the design of the disposal facility as far as reasonably practicable.

*Related **IAEA** safety standards:*

The operator shall evaluate the site and shall design, construct, operate and close the disposal facility in such a way that safety is ensured by passive means to the fullest extent possible and the need for actions to be taken after closure of the facility is minimized. (SSR-5, Requirement 5)

DI-46:

The licensee shall design the equipment of the disposal facility to take account of radiation protection aspects, ease of maintenance and inspection, and minimization of the probability and consequences of anticipated operational occurrences and, as far as practicable, possible accidents during handling.

*Related **IAEA** safety standards:*

The design and layout of items important to safety shall include provisions to optimize protection in maintenance, inspection and testing activities. The term 'maintenance' includes both preventive actions and corrective actions. (SSR-4, para 6.105)

2.2.4 Safety issue: Information gathering and monitoring

DI-47:

Before starting construction, the licensee shall establish a baseline state of the environment both for supporting the monitoring programme and for evaluating the impact of the facility on the environment.

*Related **IAEA** safety standards:*

The site for a disposal facility shall be characterized at a level of detail sufficient to support a general understanding of both the characteristics of the site and how the site will evolve over time. This shall include its present condition, its probable natural evolution and possible natural events, and also human plans and actions in the vicinity that may affect the safety of the facility over the period of interest. It shall also include a specific understanding of the impact on safety of features, events and processes associated with the site and the facility. (SSR-5, Requirement 15)

Baseline monitoring is concerned with measurement of the initial values of parameters that will continue to be monitored by either continuous or periodic observations. The scope of baseline monitoring includes the determination of conditions and parameters of potential interest for the understanding of basic earth science, engineering and the environment, and for informing the operational safety assessment and the post-closure safety assessment for the disposal facility. For example, baseline monitoring is used to evaluate changes that occur in the rock and the groundwater system during the construction and operational periods and, at the post-closure stage, to evaluate any significant impacts that the presence of the disposal facility may have on natural processes and the environment. In practice, the monitoring programme will begin during the site investigation stage. […] (SSG-31, para 6.5)

DI-48:

Before starting construction, the licensee shall define and document a systematic monitoring programme to be implemented during construction, commissioning, operation, decommissioning and closure, and as appropriate after closure.

*Related **IAEA** safety standards:*

A programme of monitoring shall be carried out prior to, and during, the construction and operation of a disposal facility and after its closure, if this is part of the safety case. This programme shall be designed to collect and update information necessary for the purposes of protection and safety. Information shall be obtained to confirm the conditions necessary for the safety of workers and members of the public and protection of the environment during the period of operation of the facility.

Monitoring shall also be carried out to confirm the absence of any conditions that could affect the safety of the facility after closure. (SSR-5, Requirement 21)

[…] Plans for monitoring with the aim of providing assurance of safety after closure have to be drawn up before the construction of a geological disposal facility to indicate possible monitoring strategies. […] (SSR-5, para 5.5)

DI-49:
The licensee shall ensure that the monitoring programme contributes to:

- Demonstrating adequate protection of people and the environment and demonstrating compliance with the regulatory requirements and licence conditions;
- Confirming that the disposal facility and system behaves and evolves as expected in the safety case;
- Building confidence in and refining the key assumptions and models made in the safety case;
- Enhancing understanding of the environmental conditions and of the functioning of the disposal system;
- Acquiring information for supporting decision-making and;
- Providing background information for any post-closure surveillance programme.

*Related **IAEA** safety standards:*

Monitoring has to be carried out at each step in the development and in the operation of a disposal facility. The purposes of the monitoring programme include:

(a) Obtaining information for subsequent assessments;
(b) Assurance of operational safety
(c) Assurance that conditions at the facility for operation are consistent with the safety assessment;
(d) Confirmation that conditions are consistent with safety after closure.

(SSR-5, para 5.4)

2.2.5 Safety issue: Construction

DI-50:
The licensee shall construct the disposal facility in accordance with the design as described in the safety case and by application of appropriately proven techniques.

*Related **IAEA** safety standards:*

The disposal facility shall be constructed in accordance with the design as described in the approved safety case and supporting safety assessment. […] (SSR-5, Requirement 17)

DI-51:
The licensee shall construct the disposal facility in such a way as to preserve the post-closure safety functions of the host environment.

*Related **IAEA** safety standards:*

[…] It shall be constructed in such a way as to preserve the safety functions of the host environment that have been shown by the safety case to be important for safety after closure. Construction activities shall be carried out in such a way as to ensure safety during the operational period. (SSR-5, Requirement 17)

DI-52:

In order to refine the assumptions of the safety case, the licensee shall gather information during construction to improve the knowledge of:

- The intrinsic properties of the host environment
- The response of the host environment to the presence of the disposal facility.

*Related **IAEA** safety standards:*

A programme of monitoring shall be carried out prior to, and during, the construction and operation of a disposal facility and after its closure, if this is part of the safety case. This programme shall be designed to collect and update information necessary for the purposes of protection and safety. Information shall be obtained to confirm the conditions necessary for the safety of workers and members of the public and protection of the environment during the period of operation of the facility. Monitoring shall also be carried out to confirm the absence of any conditions that could affect the safety of the facility after closure. (SSR-5, Requirement 21)

DI-53:

The licensee shall plan, assess, document and implement any modifications of design, construction procedures and methods using arrangements consistent with the importance to safety of the modification. These arrangements shall ensure that the modifications will not have an unacceptable effect on operational and post-closure safety.

*Related **IAEA** safety standards:*

The operating organization shall establish and implement a programme for the control of modifications to the facility. (SSR-4, Requirement 61)

Proposals for modifications to the facility shall be categorized and relevant criteria for this categorization shall be established, in accordance with a graded approach. Proposals for modifications shall be categorized either in accordance with the safety significance of the modification or on the basis of a statement of whether or not the proposed change will reduce the safety margins or challenge current operational limits and conditions or other significant acceptance criteria (e.g. collective or individual doses to workers). (SSR-4, para 9.58)

2.2.6 Safety issue: Operation

DI-54:

The licensee shall operate the facility in accordance with the conditions of the licence and the

relevant regulatory requirements so as to maintain safety during the operational phase, and so as to establish and preserve the post-closure safety functions claimed in the safety case.

*Related **IAEA** safety standards:*

The disposal facility shall be operated in accordance with the conditions of the licence and the relevant regulatory requirements so as to maintain safety during the operational period and in such a manner as to preserve the safety functions assumed in the safety case that are important to safety after closure. (SSR-5, Requirement 18)

DI-55:

The licensee shall make and implement arrangements to detect and respond to anticipated operational occurrences and possible accidents. Provisions for doing so shall not unacceptably affect operational or post-closure safety.

*Related **IAEA** safety standards:*

The operating organization shall establish an accident management programme based on the results of the safety analysis. (SSR-4, Requirement 71)

An accident management programme shall be developed that covers the preparatory measures and guidelines to reduce the risk of [an operational accident] and, if an [operational accident] occurs, to return the facility to a controlled state in which it can be maintained in a safe condition. The accident management programme shall take account of chemical hazards associated with nuclear activities. The accident management programme shall establish the organizational arrangements for accident management, and shall also include arrangements for communication and the training necessary for the implementation of the programme. (SSR-4, para 9.118)

DI-56:

In order to refine the assumptions of the safety case, the licensee shall continue to gather information during operation to improve the knowledge of:

- The intrinsic properties of the host environment
- The response of the host environment to the presence of the disposal facility.

*Related **IAEA** safety standards:*

A programme of monitoring shall be carried out prior to, and during, the construction and operation of a disposal facility and after its closure, if this is part of the safety case. This programme shall be designed to collect and update information necessary for the purposes of protection and safety. Information shall be obtained to confirm the conditions necessary for the safety of workers and members of the public and protection of the environment during the period of operation of the facility. Monitoring shall also be carried out to confirm the absence of any conditions that could affect the safety of the facility after closure. (SSR-5, Requirement 21)

DI-57:

The licensee shall establish, substantiate, document and implement operational limits and

conditions (OLCs) to operate the disposal facility safely, to maintain the waste in a safe state during operation and to ensure compliance with the requirements for post-closure safety.

*Related **IAEA** safety standards:*

Operational limits and conditions shall be prepared in the design stage, confirmed in the commissioning stage and established before operations of the facility commence. (SSR-4, Requirement 18)

Operational limits and conditions are a set of rules setting forth parameter limits, the functional capability and the performance levels of equipment and personnel for the safe operation of a facility. Operational limits and conditions necessary for safe operation shall be developed in the design stage for a new facility and updated, if necessary, during commissioning to allow time for validation and approval. (SSR-4, para 6.58)

DI-58:

The licensee shall make adequate arrangements for commissioning and operation of the disposal facility including arrangements for receiving, handling and emplacement of waste before these activities are commenced.

*Related **IAEA** safety standards:*

The operating organization shall ensure that a commissioning programme for the nuclear fuel cycle facility is established and implemented. (SSR-4, Requirement 54)

The commissioning programme shall cover the full range of facility conditions considered in the design. The commissioning programme shall establish the organization of and responsibilities for commissioning, the commissioning stages, the suitable testing of items on the basis of their importance to safety, the test schedule, the commissioning procedures and reports, the methods of review and verification, the treatment of deficiencies and deviations, and the requirements for documentation. (SSR-4, para 8.2)

DI-59:

Before starting the emplacement of any waste, the licensee shall review the plan for decommissioning, closure and post-closure activities.

*Related **IAEA** safety standards:*

The revisions of the safety case that are developed in parallel with the development, operation and closure of the disposal facility should include plans for waste management, facility development, facility closure and institutional control. For example, the closure plans should describe and demonstrate the feasibility of both the closure operations and the time schedule for them. The closure plans should be updated and refined as information is obtained during site characterization, design optimization, construction and operation of the disposal facility. An authorization to commence waste emplacement should include consideration of preliminary closure plans, although these plans may change as operations proceed. (SSG-29, para 5.26)

DI-60:

The licensee shall ensure that any modifications to the disposal facility will not have an unacceptable effect on operational and post-closure safety.

*Related **IAEA** safety standards:*

The safety of existing disposal facilities shall be assessed periodically until termination of the licence. During this period, the safety shall also be assessed when a safety significant modification is planned or in the event of changes with regard to the conditions of the authorization. […] (SSR-5, Requirement 26)

To maintain the assurance of robust safety assessment and safety case, the facility design process should be conducted within a management system providing for configuration change control. Design attributes of the engineered barriers for operational safety and post-closure safety should be classified to ensure application of design requirements is graded in accordance with the safety significance of the barrier. (SSG-14, 6.34)

DI-61:

The licensee shall plan, assess, document and implement any modifications of design, waste acceptance criteria, structures, systems and components (SSCs), operational limits and conditions (OLCs) and operational procedures and methods using arrangements consistent with the importance to safety of the modifications.

*Related **IAEA** safety standards:*

The operating organization shall establish and implement a programme for the control of modifications to the facility. (SSR-4, Requirement 61)

The operating organization shall have the overall responsibility for all safety aspects of the preparation and performance of modifications. In addition, it shall establish procedures for the control of modification projects. The operating organization may assign or subcontract the execution of certain tasks to other organizations but it shall not delegate its responsibilities. In particular, the operating organization shall be responsible for the management of proposed modification projects, in which senior management shall participate in accordance with the established procedures. For major modifications, this participation shall include the setting of the objectives and the structure of the project, the appointment of a project manager, the specification of responsibilities and the allocation of adequate resources. (SSR-4, para 9.56)

DI-62:

The licensee shall prepare and implement an on-site emergency plan to respond to possible accidents requiring protection of the personnel and members of the public. This emergency plan shall be proportionate to the consequences of the possible accidents considered and shall provide for:

- Regaining control of the disposal facility in an emergency;
- Preventing or mitigating the consequences of any such emergency;

If an off-site emergency plan is required, the licensee shall provide the technical basis for its development and implementation.

*Related **IAEA** safety standards:*

The operating organization shall establish arrangements for on-site preparedness for, and response to, a nuclear or radiological emergency. (SSR-4, R-72)

The operating organization shall develop emergency arrangements in accordance with the applicable requirements [6] and shall establish the necessary emergency plans and organizational structure, with assigned authority and responsibilities for managing an emergency response. When appropriate, the operating organization shall coordinate with off-site response organizations in the development of on-site and off-site emergency arrangements that are consistent with one another and that can be promptly executed and effectively managed. Emergencies that involve multiple locations shall be considered in the arrangements. (SSR-4, para 9.122)

DI-63:

For the purposes of emergency planning the licensee shall, as appropriate:

- Establish and implement the necessary organizational structure for clear allocation of responsibilities and authorities,
- Ensure that, based on the on-site emergency plan, appropriate trained and qualified personnel, facilities and equipment needed to control an emergency will be available whenever they might be required, and
- Establish arrangements as necessary for coordinating emergency activities and cooperating with external response organisations throughout all phases of an emergency.

*Related **IAEA** safety standards:*

The operating organization and response organizations shall identify the knowledge, skills and abilities necessary to perform the functions specified in Section 5. The operating organization and response organizations shall make arrangements for the selection of personnel and for training to ensure that the personnel selected have the requisite knowledge, skills and abilities to perform their assigned response functions. The arrangements shall include arrangements for continuing refresher training on an appropriate schedule and arrangements for ensuring that personnel assigned to positions with responsibilities in an emergency response undergo the specified training. (GSR Part 7, para 6.28)

DI-64:

The licensee shall submit the on-site emergency plan to the regulatory body. At regular intervals, the licensee shall carry out emergency exercises, some of which shall be witnessed by the regulatory body. Some of these exercises shall, as appropriate, include the participation of external emergency response organizations. The plan shall be subject to review and updating in the light of the experience gained.

*Related **IAEA** safety standards:*

The operating organization shall develop emergency arrangements in accordance with the applicable requirements [6] and shall establish the necessary emergency plans and organizational structure, with assigned authority and responsibilities for managing an emergency response. When appropriate, the operating organization shall coordinate with off-site response organizations in the development of on-

site and off-site emergency arrangements that are consistent with one another and that can be promptly executed and effectively managed. Emergencies that involve multiple locations shall be considered in the arrangements. (SSR-4, para 9.122)

DI-65:

The licensee shall establish and implement programmes for maintenance, periodic testing and inspection, based on written procedures in order to ensure and confirm that structures, systems and components (SSCs) are able to function in accordance with the requirements for operational and post-closure safety.

*Related **IAEA** safety standards:*

The operating organization shall ensure that effective programmes for maintenance, periodic testing and inspection are established and implemented. (SSR-4, Requirement 65)

Maintenance, periodic testing and inspection shall be conducted to ensure that items important to safety are able to function in accordance with their design intent and safety requirements, in compliance with the operational limits and conditions, and shall support the long term safety of the facility. In this context, maintenance includes both preventive actions and corrective actions. (SSR-4, para 9.74)

DI-66:

The licensee shall record and assess the results of maintenance, periodic testing and inspection, important to safety. Results derived from these programmes shall be used to review the adequacy of the design, construction and operation of the disposal facility and to identify any implications for post-closure safety.

*Related **IAEA** safety standards:*

The frequency of maintenance, periodic testing and inspection of individual items important to safety shall be adjusted on the basis of experience and shall be such as to ensure adequate reliability. The operating organization shall assess the results of maintenance, periodic testing and inspection, and shall incorporate the feedback for continuous improvement. (SSR-4, para 9.80)

The results of maintenance, testing and inspection shall be recorded and assessed. (NS-R-5, para 9.32)

DI-67:

At regular intervals, the licensee shall review and as necessary revise programmes for maintenance, periodic testing and inspection to incorporate the lessons learned from experience.

*Related **IAEA** safety standards:*

The maintenance, periodic testing and inspection programmes and their performance shall be reviewed at regular intervals to incorporate lessons learned from experience (see Requirement 73). All maintenance, periodic testing and inspection of items important to safety shall be carried out by following approved procedures. (SSR-4, para 9.77)

2.2.7 Safety issue: Closure of disposal facility

DI-68:

The licensee shall close the disposal facility in such a way as to provide for the safety functions required after closure.

*Related **IAEA** safety standards:*

A disposal facility shall be closed in a way that provides for those safety functions that have been shown by the safety case to be important after closure. […] (SSR-5, Requirement 19)

DI-69:

Before starting decommissioning and closure, the licensee shall define the corresponding programme so that it takes into account, as appropriate:

- The state of the facility, as constructed and operated including information on waste inventory and emplacement;
- Dismantling and removal of operational equipment;
- Remaining backfilling and sealing;
- Decommissioning of auxiliary structures, e.g. parts of the facility on the surface;
- Environmental remediation as required;
- Programmes for monitoring and surveillance,
- Programmes for security and safeguards;
- Plans for preserving knowledge and records about the waste disposed of and the disposal system.

*Related **IAEA** safety standards:*

A disposal facility shall be closed in a way that provides for those safety functions that have been shown by the safety case to be important after closure. Plans for closure, including the transition from active management of the facility, shall be well defined and practicable, so that closure can be carried out safely at an appropriate time. (SSR-5, Requirement 19)

Closure of a geological disposal facility should also include decommissioning of surface facilities and undertaking any environmental restoration necessary, and may include the construction of durable markers. (SSG-14, para 6.59)

DI-70:

The licensee shall perform decommissioning and closure activities in accordance with the national legal and regulatory framework so as to maintain safety during decommissioning and closure, and so as to establish and preserve the post-closure safety functions claimed in the safety case.

*Related **IAEA** safety standards:*

A disposal facility shall be closed in a way that provides for those safety functions that have been shown by the safety case to be important after closure. Plans for closure, including the transition from active

management of the facility, shall be well defined and practicable, so that closure can be carried out safely at an appropriate time. (SSR-5, Requirement 19)

DI-71:

The licensee shall plan, assess, document and implement any modifications in the decommissioning and closure procedures and methods using arrangements consistent with the importance to safety of the modifications.

*Related **IAEA** safety standards:*

[…] Plans for closure, including the transition from active management of the facility, shall be well defined and practicable, so that closure can be carried out safely at an appropriate time. (SSR-5, Requirement 19)

The operating organization shall prepare a decommissioning plan and shall maintain it throughout the lifetime of the facility, unless otherwise approved by the regulatory body, to show that decommissioning can be accomplished safely and in such a way as to meet the defined end state. (SSR-4, Requirement 74)

[…]. The decommissioning plan shall be updated in accordance with changes in regulatory requirements, modifications, advances in technology, changes in the need for decommissioning activities and changes in national policies. All operational activities at the facility, including maintenance, periodic testing and inspection, modification and experiments, shall be conducted in a way that will facilitate their ultimate decommissioning [8]. (SSR-4, para 10.1)

2.2.8 Safety issue: Post-closure phase and release from regulatory control

DI-72:

After closure and until termination of the licence, the licensee shall implement a post-closure surveillance programme, if appropriate. In the event that surveillance demonstrates the need for remedial actions, the licensee shall implement such actions in accordance with the licence.

*Related **IAEA** safety standards:*

The operator of a disposal facility for radioactive waste shall be responsible for its safety. The operator shall carry out safety assessment and develop and maintain a safety case, and shall carry out all the necessary activities for site selection and evaluation, design, construction, operation, closure and, if necessary, surveillance after closure, in accordance with national strategy, in compliance with the regulatory requirements and within the legal and regulatory infrastructure. (SSR-5, Requirement 3)

A programme of monitoring shall be carried out prior to, and during, the construction and operation of a disposal facility and after its closure, if this is part of the safety case. […] Monitoring shall also be carried out to confirm the absence of any conditions that could affect the safety of the facility after closure. (SSR-5, Requirement 21)

Closure of the disposal facility indicates the start of the period of institutional control. This period can be subdivided into active and passive phases, whose durations may be prescribed by regulation. Activities during the active phase of the period of institutional control will include preservation of knowledge, prevention of human intrusion, and monitoring and surveillance. If damage to, or deterioration of, the barriers is detected by means of monitoring or surveillance, remedial measures should be taken to restore any lost safety functionality to the parts of the disposal facility that remain accessible, at a minimum. (SSG-29, para 4.45)

DI-73:

As a condition for the termination of the licence, the licensee shall:

- Demonstrate that the results of any surveillance programme are consistent with the assumptions of the safety case, to the satisfaction of the regulatory body;
- Propose any restrictions on land use, suggest and substantiate the way they shall be implemented, or any other measures deemed appropriate for the post-licensing phase.

*Related **IAEA** safety standards:*

After completion of the emplacement operations, but before the final closure of the disposal facility, monitoring and surveillance data should be collected to confirm the continuing performance of key safety functions as identified in the safety case, either through direct evidence (i.e. by means of a measurable parameter) or indirect evidence (i.e. by enhancing the scientific basis used to develop predictive models or through the collection of data from pilot/demonstration disposal facilities). The data obtained should be used to verify that the disposal system is functioning as expected. This means that the key components are fulfilling their functions, as identified in the safety case, or as stipulated by the regulatory body, and that actual conditions are consistent with the key assumptions made for safety after closure. For example, the data obtained may be used to help support a decision to terminate active institutional control, by verifying that the disposal system has remained in a passively safe condition for a specified period of time.(SSG-31, para 8.10)

Plans shall be prepared for the period after closure to address institutional control and the arrangements for maintaining the availability of information on the disposal facility. These plans shall be consistent with passive safety features and shall form part of the safety case on which authorization to close the facility is granted. (SSR-5, Requirement 22)

[...]. Plans for possible future controls and the period over which they would be applied may initially be flexible and conceptual in nature, but plans have to be developed and refined as the facility approaches closure. Consideration has to be given to: local land use controls; site restrictions or surveillance and monitoring; local, national and international records; and the use of durable surface and/or subsurface markers. [...] (SSR-5, para 5.13)

2.3
Safety Area: Waste acceptance

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2.3.1 Safety issue: Derivation of waste acceptance criteria

DI-74:
The licensee shall contribute to the safe management of the waste by establishing preliminary waste acceptance criteria at the earliest opportunity. The licensee shall update such preliminary waste acceptance criteria to reflect the development of the disposal project.

*Related **IAEA** safety standards:*

Waste packages and unpackaged waste accepted for emplacement in a disposal facility shall conform to criteria that are fully consistent with, and are derived from, the safety case for the disposal facility in operation and after closure. (SSR-5, Requirement 20)

Waste acceptance criteria have to be developed that specify the radiological, mechanical, physical, chemical and biological characteristics of waste packages and unpackaged waste that are to be processed, stored or disposed of; for example, their radionuclide content or activity limits, their heat output and the properties of the waste form and packaging. (GSR Part 5, para 4.24)

The proposed waste acceptance criteria should be published at the earliest opportunity, to facilitate compatibility of the waste generated and its safe management at the waste generation sites prior to its emplacement in the disposal facility. (SSG-14, para 6.41)

DI-75:
Prior the start of waste emplacement, the licensee shall specify waste acceptance criteria so as to ensure the conformity of individual waste consignments to the safety case and other aspects of the disposal arrangements. The waste acceptance criteria shall be consistent with the operational and post-closure safety case and shall be reported to the regulatory body, for approval if appropriate.

*Related **IAEA** safety standards:*

Waste acceptance requirements and criteria for a given disposal facility have to ensure the safe handling of waste packages and unpackaged waste in conditions of normal operation and anticipated operational occurrences. They also have to ensure the fulfilment of the safety functions for the waste form and waste packaging with regard to safety in long term. […] (SSR-5, para 5.1)

Waste packages and unpackaged waste accepted for emplacement in a disposal facility shall conform to criteria that are fully consistent with, and are derived from, the safety case for the disposal facility in operation and after closure. (SSR-5, Requirement 20)

DI-76:

The licensee shall ensure that waste acceptance criteria specify limits on important parameters such as radionuclide inventories and activity concentrations in individual waste consignments.

Appendix 2 presents further details of the typical content for low and intermediate level waste.

*Related **IAEA** safety standards:*

The waste characteristics important to the safety of the operational and post-closure periods are part of the relevant safety case. Waste acceptance criteria may be developed by means of an iterative dialogue between regulatory body, the operator of the facility and the generator of the waste. The criteria should include the waste characteristics important to safety in the operational period and the period after closure and typically specify the following:

(a) The permissible range of chemical and physical properties of the waste and the waste form;
(b) The permissible dimensions, weight and other manufacturing specifications of each waste package;
(c) Allowable levels of radioactivity in each package;
(d) Allowable amounts of fissile material in each package;
(e) Allowable surface dose rate and surface contamination;
(f) Requirements for accompanying documentation;
(g) Allowable decay heat generation for each package.

(SSG-14, para 6.38)

DI-77:

The licensee shall specify criteria to ensure that waste accepted for disposal is physically and chemically stable over a timescale consistent with the safety case and compatible with other components of the disposal facility.

*Related **IAEA** safety standards:*

Modelling and/or testing of the behaviour of waste forms has to be undertaken to ensure the physical and chemical stability of the different waste packages and unpackaged waste under the conditions expected in the disposal facility, and to ensure their adequate performance in the event of anticipated operational occurrences or accidents. (SSR-5, para 5.2)

2.3.2 Safety issue: Revision of waste acceptance criteria

DI-78:

The licensee shall report changes to waste acceptance criteria to the regulatory body, for approval if appropriate. The licensee shall substantiate the consistency of any changes with the assumptions made in the safety case.

*Related **IAEA** safety standards:*

The waste characteristics important to the safety of the operational and post-closure periods are part of the relevant safety case. Waste acceptance criteria may be developed by means of an iterative dialogue between regulatory body, the operator of the facility and the generator of the waste. The criteria should include the waste characteristics important to safety in the operational period and the period after closure […] (SSG-14, para 6.38)

2.3.3 Acceptance of waste

DI-79:

The licensee shall ensure that the waste accepted for disposal conforms to waste acceptance criteria. A conformity assessment shall be performed in accordance with written arrangements which include administrative procedures, inspections and/or tests.

*Related **IAEA** safety standards:*

Waste intended for disposal has to be characterized to provide sufficient information to ensure compliance with waste acceptance requirements and criteria. Arrangements have to be put in place to verify that the waste and waste packages received for disposal comply with these requirements and criteria and, if not, to confirm that corrective measures are taken by the generator of the waste or the operator of the disposal facility. The quality control of waste packages has to be undertaken and is achieved mainly on the basis of records, preconditioning testing (e.g. of containers), and control of the conditioning process. (SSR-5, para 5.3)

DI-80:

The licensee shall provide a system for tracing the location in the disposal facility of any waste disposed of.

*Related **IAEA** safety standards:*

The management system for a disposal facility has to provide for the preparation and retention of documentary evidence to illustrate that the necessary quality of data has been achieved; […] that the waste packages and unpackaged waste comply with established requirements and criteria; and that they have been properly emplaced in the disposal facility. […]. (SSR-5, para 5.26)

DI-81:

To provide an adequate level of assurance that waste characteristics conform to the waste acceptance criteria, the licensee shall satisfy itself that the management system of the organization submitting waste for disposal appropriately addresses waste quality issues.

*Related **IAEA** safety standards:*

The waste acceptance process established by the operator should take into account the steps of waste generation and waste processing. Depending on national responsibilities, the waste generator, the waste management organization or the operator of the disposal facility should establish and/or apply waste acceptance criteria and technical specifications and procedures for controlling waste generation,

waste processing and waste characterization. This should ensure that there will be mechanisms (e.g. procedures and controls) in place during the process of waste generation and management that will ensure that the waste acceptance criteria for disposal can and will be met. As part of the waste acceptance process, the operator should carry out verifications and controls when waste is received for disposal. The major elements of the waste acceptance process should be presented to the regulatory body for approval, for example as part of the safety case for the application of a licence.
(SSG-29, para 6.31)

DI-82:

The licensee shall establish procedures for dealing with waste that does not conform to waste acceptance criteria, and shall not accept such waste unless acceptability with regard to operational and post-closure safety has been demonstrated on a case by case basis.

*Related **IAEA** safety standards:*

Waste intended for disposal is characterized to provide sufficient information to ensure compliance with waste acceptance requirements and criteria. Arrangements will be put in place to verify that the waste and waste packages received for disposal comply with these requirements and criteria, and, if not, to confirm that corrective measures are taken by the generator of the waste or the operator of the disposal facility. Quality control of waste packages has to be undertaken and is achieved mainly on the basis of records, preconditioning testing (e.g. of containers) and control of the conditioning process. Post-conditioning testing and the need for corrective measures have to be limited as far as practicable.
(SSR-5, para 5.3)

2.4
Safety area: Safety verification

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2.4.1 Safety issue: Scope and content of the safety case

DI-83:

The licensee shall provide to the regulatory body a safety case substantiating that operational and post-closure safety requirements as specified in the national legal and regulatory framework are met. The licensee shall update the safety case in accordance with regulatory requirements.

*Related **IAEA** safety standards:*

A safety case and supporting safety assessment shall be prepared and updated by the operator, as necessary, at each step in the development of a disposal facility, in operation and after closure. The safety case and supporting safety assessment shall be submitted to the regulatory body for approval. The safety case and supporting safety assessment shall be sufficiently detailed and comprehensive to provide the necessary technical input for informing the regulatory body and for informing the decisions necessary at each step. (SSR-5, Requirement 12)

The safety case for a disposal facility has to address safety both in operation and after closure. […] All aspects of operation relevant to safety are considered, including surface and underground excavation, construction and mining work, waste emplacement, and backfilling, sealing and closing operations. Consideration has to be given to both occupational exposure and public exposure resulting from conditions of normal operation and anticipated operational occurrences over the operating lifetime of the disposal facility. (SSR-5, para 4.15)

DI-84:

The licensee shall provide assurance through the safety case that workers, members of the public and the environment are and will remain adequately protected against the hazards associated with the waste being disposed of.

*Related **IAEA** safety standards:*

The safety case for a disposal facility shall describe all safety relevant aspects of the site, the design of the facility and the managerial control measures and regulatory controls. The safety case and supporting safety assessment shall demonstrate the level of protection of people and the environment provided and shall provide assurance to the regulatory body and other interested parties that safety requirements will be met. (SSR-5, Requirement 13)

DI-85:

The licensee shall include in the safety case, a safety assessment that demonstrates

conformity with the safety requirements. The licensee shall also present an evaluation of the technical feasibility of the design and the construction, operation, decommissioning, closure and post-closure activities.

*Related **IAEA** safety standards:*

Safety assessment in support of the safety case has to be performed and updated throughout the development and operation of the disposal facility and as more refined site data become available. Safety assessment has to provide input to ongoing decision making by the operator. Such decision making may relate to subjects for research, development of a capability for assessment, allocation of resources and development of waste acceptance criteria. (SSR-5, para 4.13)

The primary purposes of the safety assessment shall be to determine whether an adequate level of safety has been achieved for a facility or activity and whether the basic safety objectives and safety criteria established by the designer, the operating organization and the regulatory body, in compliance with the requirements for protection and safety as established in the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources , IAEA Safety Standards Series No. GSR Part 3, have been fulfilled. (GSR part 4 (Rev.1), Requirement 4)

DI-86:

The licensee shall include in the safety assessment for the operational and post-closure phases:

- An evaluation of the performance and robustness of the disposal facility and system and its components;
- An evaluation of the radiological impact.

*Related **IAEA** safety standards:*

Robustness of a component of the disposal system means that it will continue to fulfil its expected safety function(s) irrespective of disturbances that may reasonably be expected to occur (see paras 4.33 and 4.51). Sites can be selected, for example, by choosing those that are little affected by natural processes such as flooding and earthquakes. Similarly, the engineered barriers can be designed for robustness, for example, by expanding the dimensioning of certain components beyond the necessary values to ensure their resilience to disturbances and uncertainties. (SSG-23, para 6.39)

Robustness of the disposal system is evaluated through comparison of the results of analyses of the base case with those of a range of scenarios illustrating specific perturbations or uncertainties. Among the different types of perturbation, the most generally considered are those where one component or one of its characteristics is considered to have failed ('what if' scenarios). Scenarios involving such strong perturbations applied to the disposal system are distinguished from scenarios describing degraded behaviour of the disposal system. (SSG-23, para 6.41)

DI-87:

The licensee shall describe in the safety case all safety important aspects of the disposal facility and system including the waste to be disposed of, the design, the construction, operation, closure, decommissioning and post-closure activities. The typical content of a safety case is given in Appendix 3.

*Related **IAEA** safety standards:*

The safety case for a disposal facility shall describe all safety relevant aspects of the site, the design of the facility and the managerial control measures and regulatory controls. The safety case and supporting safety assessment shall demonstrate the level of protection of people and the environment provided and shall provide assurance to the regulatory body and other interested parties that safety requirements will be met. (SSR-5, Requirement 13)

The safety case for a disposal facility has to address safety both in operation and after closure. […. All aspects of operation relevant to safety are considered, including surface and underground excavation, construction and mining work, waste emplacement, and backfilling, sealing and closing operations. Consideration has to be given to both occupational exposure and public exposure resulting from conditions of normal operation and anticipated operational occurrences over the operating lifetime of the disposal facility. (SSR-5, para 4.15)

DI-88:

The licensee shall in the safety case take due consideration to future human actions including inadvertent human intrusion. Such consideration should focus on reducing the likelihood and potential consequences of inadvertent human intrusion. Any measures taken to prevent inadvertent human intrusion must not compromise the operational safety of the disposal facility and the post-closure safety of the disposal system.

*Related **IAEA** safety standards*

The disposal facility shall be sited, designed and operated to provide features that are aimed at isolation of the radioactive waste from people and from the accessible biosphere. … In so doing, consideration shall be given to both the natural evolution of the disposal system and events causing disturbance of the facility. (SSR-5, Requirement 9)

In some cases, it may not be possible to provide sufficient assurance of separation from the accessible biosphere, owing to phenomena such as uplift, erosion and glaciation. In such cases, and if the remaining activity in the waste is still significant at the time such phenomena occur, the possibility of human intrusion has to be evaluated in determining the degree of isolation provided. (SSR-5, para 3.46)

DI-89:

The licensee shall ensure that the safety case provides a clear understanding of the safety arguments, is suitably comprehensive and documented with a content and level of detail appropriate to the step reached in the disposal facility development.

*Related **IAEA** safety standards:*

Disposal facilities for radioactive waste shall be developed, operated and closed in a series of steps. Each of these steps shall be supported, as necessary, by iterative evaluations of the site, of the options for design, construction, operation and management, and of the performance and safety of the disposal system. (SSR-5, Requirement 11)

[…] The safety case and supporting safety assessment shall be sufficiently detailed and comprehensive to provide the necessary technical input for informing the regulatory body and for informing the decisions necessary at each step. (SSR-5, Requirement 12)

The safety case and supporting safety assessment for a disposal facility shall be documented to a level of detail and quality sufficient to inform and support the decision to be made at each step and to allow for independent review of the safety case and supporting safety assessment. (SSR-5, Requirement 14)

DI-90:

The licensee shall ensure that the safety case provides clarity, substantiation and traceability of the assumptions, choices and decisions made.

*Related **IAEA** safety standards:*

The necessary scope and structure of the documentation setting out the safety case and supporting safety assessment will depend on the step reached in the project for the disposal facility and on national requirements. This includes consideration of the needs of different interested parties for information. Important considerations in documenting the safety case and supporting safety assessment are justification, traceability and clarity. (SSR 5, para 4.23)

Justification concerns explaining the basis for the choices that have been made and the arguments for and against the decisions, especially those decisions concerning the main arguments for safety. Traceability concerns the ability of an independent qualified person to follow what has been done. The traceability has to enable technical and regulatory review. Justification and traceability both require a well-documented record of the decisions made and the assumptions made in the development and operation of a disposal facility, and of the models and data used in deriving a particular set of results for safety assessment purposes. (SSR-5, para 4.24)

Clarity concerns good structure and presentation at an appropriate level of detail so as to allow an understanding of the safety arguments. This requires the results of work to be presented in the documents in such a way that interested parties for whom the material is intended can gain a good understanding of the safety arguments and their basis. Different types and styles of document may be necessary to provide material that is useful to different parties. (SSR-5, para 4.25)

DI-91:

The licensee shall ensure that the safety case adequately reflects the factors (e.g. features, events and processes) that influence safety and their significance.

*Related **IAEA** safety standards:*

The operator of a disposal facility shall develop an adequate understanding of the features of the facility and its host environment and of the factors that influence its safety after closure over suitably long time periods, so that a sufficient level of confidence in safety can be achieved.
(SSR-5, Requirement 6)

DI-92:

The licensee shall identify all uncertainties significant to safety and shall demonstrate that

these uncertainties are adequately taken into account in the safety case. As part of the safety case, the licensee shall describe a programme for uncertainty management.

*Related **IAEA** safety standards:*

At any step in the development of a disposal facility, the safety case also has to identify and acknowledge the unresolved uncertainties that exist at that stage and their safety significance, and approaches for their management. (SSR-5, para 4.7)

The safety case for a radioactive waste disposal facility is required to be developed and progressively updated throughout the lifetime of the disposal facility [2]. Confidence in the safety case at any stage will be enhanced if each revision of the safety case includes a plan for further work as necessary to address significant unresolved issues, in particular to reduce significant remaining uncertainties or to reduce their relevance or avoid them entirely by, for example, changes in the design of system components. (SSG-23, para 4.87)

DI-93:

The licensee shall ensure that the safety case shows that the principle of optimization has been addressed in relevant choices and decisions on the disposal system.

*Related **IAEA** safety standards:*

Protection must be optimized to provide the highest level of safety that can reasonably be achieved (SF1, Principle 5).

Throughout the process of development and operation of a disposal facility for radioactive waste, an understanding of the relevance and the implications for safety of the available options for the facility shall be developed by the operator. This is for the purpose of providing an optimized level of safety in the operational stage and after closure. (SSR-5, Requirement 4)

Safety assessment also has to identify key processes relevant to safety and to contribute to the development of an understanding of the performance of disposal facilities. It has to support judgements with regard to alternative management options as an element of optimizing protection and safety. Such an understanding has to provide the basis for the safety arguments presented in the safety case [...]. (SSR-5, para 4.23)

DI-94:

The licensee shall present as part of the safety case the programme, plans and provisions for closure of the disposal facility and for any post-closure activities. The programme, plans and provisions shall be revised and updated as appropriate.

*Related **IAEA** safety standards:*

[…] Closure has to be considered in the initial design of the facility, and plans for closure and seal or cap designs have to be updated as the design of the facility is developed. Before construction activities commence, there has to be sufficient evidence that the performance of the backfilling, sealing and capping will function as intended to meet the design requirements.
(SSR-5, para 4.38)

Disposal facilities may not be closed for several tens of years or more after operations have commenced. Plans for possible future controls and the period over which they would be applied may initially be flexible and conceptual in nature, but plans have to be developed and refined as the facility approaches closure. […] Arrangements have to be made to be able to pass on information about the disposal facility and its contents to future generations to enable any future decisions on the disposal facility and its safety to be made. (SSR-5, para 5.13)

DI-95:

The licensee shall describe in the safety case the management system, including the principles on which it is based, and how it will evolve during future phases of development, operation and closure of the disposal facility.

*Related **IAEA** safety standards:*

The safety case for a disposal facility shall describe all safety relevant aspects of the site, the design of the facility and the managerial control measures and regulatory controls. [...]. (SSR-5, Requirement 13)

The requirements on the management system influence the development of the safety case in two ways. First, the description of the management system applying to the various stages of facility development should represent an important element of the safety case, contributing to the confidence that the relevant requirements and criteria for site selection, design, construction, operation, closure and post-closure safety are met. Second, programmes should be set up to ensure the quality of all activities associated with the safety case and safety assessment, such as data collection and modelling. […] (SSG-23, para 4.61)

DI-96:

The licensee shall include in the safety case, subject to a graded approach, a synthesis of multiple lines of reasoning regarding post-closure safety and an evaluation of the level of confidence reached.

*Related **IAEA** safety standards:*

Confidence in the safety case may also be enhanced by the use of multiple lines of reasoning. The use of multiple lines of reasoning may add value to the safety case by providing a range of different arguments that together build confidence in certain data, assumptions and results. Furthermore, certain arguments may be more meaningful to specific audiences.(SSG-23, para 4.85)

Alternative lines of reasoning to complement the results of safety assessment are, for example, natural and anthropogenic analogues; […]. In addition, confidence in the results of modelling in the safety assessment may be enhanced by the presentation of simplified calculations ('scoping calculations') of radionuclide migration or radiological impact. (SSG-23, para 4.86)

DI-97:

The licensee shall update the safety case to reflect current knowledge and submit it to the regulatory body

- in support of applications for major regulatory decisions
- as a result of major changes relevant to safety (e.g. in basic assumptions)

- at least at regular (periodic) intervals as defined in the national legal and regulatory framework

*Related **IAEA** safety standards:*

A safety case and supporting safety assessment shall be prepared and updated by the operator, as necessary, at each step in the development of a disposal facility, in operation and after closure. The safety case and supporting safety assessment shall be submitted to the regulatory body for approval. […]. (SSR-5, Requirement 12)

[…], the development of the safety case should be an iterative process that evolves with the development of the disposal facility. […], the formality and level of technical detail of the safety case will depend on the stage of development of the project, the decision in hand and specific national requirements. The step by step approach adopted for development of disposal facilities provides a basis for decision making relating to the siting, design, excavation and construction, operation and closure of facilities, and should allow the identification of issues that require further attention in order to improve the understanding of aspects influencing the safety of the disposal system and/or to reduce remaining uncertainties by appropriate design choices. (SSG-23, para 4.10)

DI-98:
The licensee shall update the safety case to reflect as a minimum:

- Changes to regulatory requirements and standards;
- Results from surveillance programmes;
- Changes to the radioactive waste inventory to be disposed of;
- Results from analysis of operational occurrences and accidents;
- Results of the periodic safety reviews;

as soon as reasonably practicable and in accordance with the safety importance of the improved knowledge.

*Related **IAEA** safety standards:*

A facility specific safety case has to be prepared early in the development of a disposal facility to provide a basis for licensing decisions and to guide activities in research and development, site selection and evaluation and design. The safety case has to be developed progressively and elaborated as the project proceeds. It has to be presented to the regulatory body at each step in the development of the disposal facility. The regulatory body might require an update of, or revision to, the safety case before given steps can be taken, or such an update or revision may be necessary to gain political or public support for taking the next step in the development of the disposal facility or for its operation or closure. The formality and level of technical detail of the safety case will depend on the stage of development of the project, the decision in hand, the audience to which it is addressed and specific national requirements. (SSR-5, para 4.12)

[…] For facilities and activities that continue over long periods of time, the safety assessment shall be updated as necessary through the stages of the lifetime of the facility or activity, so as to take into account possible changes in circumstances (such as the application of new standards or new scientific and technological developments), changes in site characteristics, and modifications to the design or operation, and also the effects of ageing. (GSR Part 4 (Rev. 1), para 4.6)

DI-99:

The licensee shall use the safety case as the basis for assessing the safety implications of changes to the disposal facility and system.

*Related **IAEA** safety standards:*

A safety assessment shall be carried out at the design stage for a new facility or activity, or as early as possible in the lifetime of an existing facility or activity. For facilities and activities that continue over long periods of time, the safety assessment shall be updated as necessary through the stages of the lifetime of the facility or activity, so as to take into account possible changes in circumstances (such as the application of new standards or new scientific and technological developments), changes in site characteristics, and modifications to the design or operation, and also the effects of ageing. (GSR Part 4 (Rev. 1), para 4.6)

The impact of any modifications to the design that have been implemented during the excavation and/or construction period should be considered in the safety case and associated safety assessment. […]. (SSG-23, para 6.17)

2.4.2 Safety issue: Operational and post-closure safety assessment

DI-100:

The licensee shall consider in the operational safety assessment, both occupational exposure and public exposure resulting from normal operation, and anticipated operational occurrences and possible accidents.

*Related **IAEA** safety standards:*

The safety case for a disposal facility has to address safety both in operation and after closure.[…] All aspects of operation relevant to safety are considered, including surface and underground excavation, construction and mining work, waste emplacement, and backfilling, sealing and closing operations. Consideration has to be given to both occupational exposure and public exposure resulting from conditions of normal operation and anticipated operational occurrences over the operating lifetime of the disposal facility. (SSR-5, para 4.15)

The safety assessment shall address all radiation risks that arise from normal operation (that is, when the facility is operating normally or the activity is being carried out normally) and from anticipated operational occurrences and accident conditions (in which failures or internal or external events have occurred that challenge the safety of the facility or activity). The safety assessment for anticipated operational occurrences and accident conditions shall also address failures that might occur and the consequences of any failures. (GSR Part 4 (Rev. 1), para 4.5)

DI-101:

The licensee shall include in the post-closure safety assessment a scenario analysis that considers the possible features, events and processes that might affect the performance of the disposal system, including events of low probability.

*Related **IAEA** safety standards:*

With regard to safety after closure, the expected range of possible developments affecting the disposal system and events that might affect its performance, including those of low probability, have to be considered in the safety case and supporting assessment by the following means:

(a) By presenting evidence that the disposal system, its possible evolutions and events that might affect it are sufficiently well understood;
(b) By demonstrating the feasibility of implementing the design;
(c) By providing convincing estimates of the performance of the disposal system and a reasonable level of assurance that all the relevant safety requirements will be complied with and that radiation protection has been optimized;
(d) By identifying and presenting an analysis of the associated uncertainties.
(SSR-5, para 4.17)

DI-102:
The licensee shall determine in the assessment whether adequate defence in depth has been provided, as appropriate, through a combination of several layers of protection (e.g. safety function provided by physical barriers, systems to protect the barriers, and administrative procedures) that would have to fail or to be bypassed before there could be any consequences for people or the environment.

*Related **IAEA** safety standards:*

It shall be determined in the safety assessment whether adequate defence in depth has been provided, as appropriate, through a combination of several layers of protection (i.e. physical barriers, systems to protect the barriers, and administrative procedures) that would have to fail or to be bypassed before there could be any consequences for people or the environment. (GSR Part 4 (Rev. 1), para 4.12)

Assessing the defence in depth is becoming normal practice in preparing the safety case for waste disposal facilities. It involves identifying the various requirements and safety functions of the disposal system, designing the disposal facility and, in particular, the engineered barriers, to fulfil these safety functions, and assessing the performance of the disposal system and the barriers in terms of their ability to fulfil the safety functions. (SSG-23, para 6.31)

DI-103:
The licensee shall substantiate the timescale over which the safety assessment is carried out in the safety case.

*Related **IAEA** safety standards:*

The time frame for the assessment is the longest period considered in the calculations for the radiological impact assessment for the period after closure. The rationale for selecting the assessment time frame should be explained and justified. (SSG-23, para 5.33)

DI-104:
The licensee shall assess the possible evolution of the criticality hazard after closure in the light of long-term uncertainties.

*Related **IAEA** safety standards:*

Fissile material, when present, has to be managed and has to be emplaced in the disposal facility in a configuration that will remain subcritical. This may be achieved by various means, including the appropriate distribution of fissile material during the conditioning of the waste and the proper design of the waste packages. Assessments have to be undertaken of the possible evolution of the criticality hazard after waste emplacement, including after closure. (SSR-5, para 4.37)

DI-105:

In the safety assessment, the licensee shall only use models and computer codes that have undergone verification and, to the extent possible, validation.

*Related **IAEA** safety standards:*

Any calculational methods and computer codes used in the safety analysis shall undergo verification and validation. (GSR Part 4 (Rev. 1), Requirement 18)

Any calculational methods and computer codes used in the safety analysis have to undergo verification and validation to a sufficient degree. Model verification is the process of determining that a computational model correctly implements the intended conceptual model or mathematical model; that is, whether the controlling physical equations and data have been correctly translated into the computer code. System code verification is the review of source coding in relation to its description in the system code documentation. Model validation is the process of determining whether a mathematical model is an adequate representation of the real system being modelled, by comparing the predictions of the model with observations of the real system or with experimental data. System code validation is the assessment of the accuracy of values predicted by the system code against relevant experimental data for the important phenomena expected to occur. The uncertainties, approximations made in the models, and shortcomings in the models and the underlying basis of data, and how these are to be taken into account in the safety analysis, shall all be identified and specified in the validation process. In addition, it shall be ensured that users of the code have sufficient experience in the application of the code to the type of facility or activity to be analysed.
(GSR Part-4 (Rev. 1), para 4.60)

2.4.3 Safety issue: Periodic safety review

DI-106:

The licensee shall carry out at regular intervals a review of the operational and post-closure safety of the facility (periodic safety review - PSR), to confirm compliance with licensing requirements. The frequency of the review shall be established by the national legal and regulatory framework (e.g. every ten years).

*Related **IAEA** safety standards:*

In accordance with national regulatory requirements, the operating organization shall carry out systematic periodic safety reviews of the nuclear fuel cycle facility throughout its lifetime, with account taken of ageing, modifications, human and organizational factors, operating experience, technical developments, new information on site evaluation and other information relating to safety from other sources. The operating organization shall verify by analysis, surveillance, testing and inspection that the physical state of the facility, including any modifications, is as described in the safety analysis report

and other safety documents and that the facility was commissioned and is operated in accordance with the safety analysis and operational limits and conditions. (SSR-4, para 4.26)

Periodic safety assessment for a disposal facility has to be aimed at providing an overall assessment of the status of protection and safety at the facility. It has to include an analysis of the operational experience acquired and possible improvements that could be made, with account taken of the existing situation and of whatever new technological developments or changes in regulatory control there might be. Periodic safety assessments cannot replace the activities for analysis, control and surveillance that are continuously carried out at disposal facilities. (SSR-5, para 6.2)

DI-107:

The licensee shall define, substantiate and submit to the regulator the scope of the Periodic Safety Review and shall ensure that, as a minimum, the following are taken into account in the PSR:

- Review and analysis of operational experience
- Review of operating experience in radiation protection aspects.
- Review of the waste acceptance criteria and waste quality controls.
- Review of knowledge and experience of aspects affecting post-closure safety.
- Review of the assumptions made in the safety case to confirm that they are still valid.
- Review of compliance with current regulatory requirements.

A guide to the content of the PSR is given in Appendix 4.

*Related **IAEA** safety standards:*

Before the review work is started, a number of prerequisites should be satisfied. The main prerequisite is an agreement between the operating organization and the regulatory body as to the scope and objectives of the PSR, including current national and international standards and codes to be used. This agreement is documented in the 'basis document' for the PSR, which should be developed by the operating organization and made subject to approval and/or confirmation by the regulatory body. (SSG-25, para 4.5)

DI-108:

The licensee shall document the results of the PSR, and derive and implement an action plan for all reasonably practicable improvements to safety.

*Related **IAEA** safety standards:*

The results of the review should be documented by the operating organization and the documentation should be submitted to the regulatory body either during the PSR or during a structured continuous improvement programme, as required. The documentation should include:

- *Reports on the review of each safety factor;*
- *A report documenting the results of the global assessment;*
- *The final PSR report, including information on the proposed safety improvements and integrated implementation plan and a summary of the reports on safety factors and the global assessment.*

[…] (SSG-25, Para 4.28)

Part 3
Benchmarking Results and Action Plans

This section provides information on the process of benchmarking, i.e. the verification of the application of disposal SRLs in WENRA Countries using a systematic appraisal procedure in the working group.

The benchmarking process compassed two main steps of evaluation. In the first step participating countries have to perform a self-assessment of their national regulatory system with regard to the WENRA safety reference levels (SRLs). In accordance with WENRA's Reactor Harmonisation Working Group (RHWG) a code of three degrees for evaluation has been applied:

- **A** – The requirement is covered explicitly by national regulatory system: no action required.
- **B** – A difference exists, but can be justified from the safety point of view: no action required.
- **C** – A difference exists and should be addressed by the member.

For the self-assessment each country has to perform the rating level by level and to justify the proposed rating by quoting the relevant text sections from the corresponding national regulatory requirements in an evaluation table. In the second step of the benchmarking the results of the self-assessment are reviewed by other countries and unclear aspects are discussed in the plenary sessions. The benchmarking results are finally endorsed by the WGWD plenary.

The list of SRLs for which implementation in the regulatory framework has been found to be lacking or insufficient – the so-called 'C' ratings – define the National Action Plan. It is each member's responsibility to resolve any such deficiencies in their national regulations and then present it back to their WENRA peers, essentially starting a new benchmarking process of the contents of its National Action Plan. While the details of benchmarking have undergone some changes with time – in particular an increase in the use of online technologies in the wake of Covid and international conflicts – the principles stayed the same since the inception of the process some 20 years ago, so that benchmarking as a form of regulatory peer review, based on set of requirements tailor-made for a specific group of countries in a specific situation, has become one of the cornerstones of WENRA's efforts to develop a harmonized international approach to nuclear safety.

This report presents the results of the benchmarking processes done since the publication of the last report version in 2015, when the first exercises started. So far, not every WENRA member has been able to prepare its own self-assessment. This report reflects the results of the benchmarking processes done for those countries that have prepared its own self-assessment on Disposal SRLs.

Belgium

This table presents the results of the Belgian NAP benchmarking with respect to the implementation of the WENRA Safety Reference Levels (SRLs) for disposal facilities.

Since the completion of the benchmarking exercise, a revised version of the WENRA Disposal Royal Decree has been developed to address the comments identified during the Belgian WENRA benchmark. In parallel, a self-assessment was carried out and indicates that the WENRA comments raised in the benchmarking have been addressed, with the exception of those related to waste acceptance. Work is currently ongoing at national level to resolve the remaining issues related to waste acceptance.

From a regulatory perspective, the WENRA Disposal Royal Decree implementing the relevant requirements was submitted and published; however, its scope was limited to surface disposal facilities under the previous legislative framework. Following the start of a new legislative period, the WENRA Disposal Royal Decree has been resubmitted and is currently progressing.

Pending the formal adoption of the Royal Decree, Belgium has not requested an update of the WENRA benchmarking. The table below is therefore retained as a snapshot of the original benchmarking results, supplemented by the contextual information provided above. Once the WENRA Disposal Royal Decree is formally adopted for all types of disposals, Belgium will request an updated WENRA benchmarking.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	C	RD2001 RD2011-Class1-Safety-Requirements-Disposal, Art. A33.1, 33.2, 43.1
DI-02	A	RD2011-Class1-Safety-Requirements-Generic, Art. 5.1A
DI-03	A	RD2011-Class1-Safety-Requirements-Generic, Art. 3, 4.2, 5.1, 11.6
DI-04	A	RD2011-Class1-Safety-Requirements-Generic, Art. 3, 14.1
DI-05	A	RD2011-Class1-Safety-Requirements-Generic, Art. 4.1, 4.3, 13.1
DI-06	C	RD2011-Class1-Safety-Requirements-Generic, Art. 9.5, 9.6 RD2011-Class1-Safety-Requirements-Disposal, Art. 33.1
DI-07	A	RD2011-Class1-Safety-Requirements-Generic, Art. 5.1
DI-08	A	RD2011-Class1-Safety-Requirements-Generic, Art. 5.2, 5.5, 6.2 Law ONDRAF, Art. 4-5.9, 6.2
DI-09	A	RD2011-Class1-Safety-Requirements-Generic, Art. 4.1
DI-10	A	RD2011-Class1-Safety-Requirements-Generic, Art. 4.3
DI-11	A	RD2011-Class1-Safety-Requirements-Generic, Art. 4.3, 6.2
DI-12	A	RD2011-Class1-Safety-Requirements-Generic, Art. 6.1, 6.2
DI-13	A	RD2011-Class1-Safety-Requirements-Generic, Art. 4.3
DI-14	C	RD2001, Art. 20.1.1.1 RD2011-Class1-Safety-Requirements-Generic, Art. 5.1, 5.2, 5.5 5.6, 11.6
DI-15	C	RD2011-Class1-Safety-Requirements-Generic, Art. 4.1, 5.1, 7

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-16	C	RD2011-Class1-Safety-Requirements-Generic, Art. 5.1, 5.6
DI-17	C	RD2011-Class1-Safety-Requirements-Generic, Art. 5.2, 6.2 RD2011-Class1-Safety-Requirements-Disposal, Art. 35
DI-18	A	RD2011-Class1-Safety-Requirements-Generic, Art. 5.2, 5.5
DI-19	A	RD2011-Class1-Safety-Requirements-Generic, Art. 11.1
DI-20	C	RD2011-Class1-Safety-Requirements-Generic, Art. 5.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 35
DI-21	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 35
DI-22	A	RD2001, Art. 20.1.1.1 RD2011-Class1-Safety-Requirements-Generic, Art. 4.2, 5.2
DI-23	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 33.2.1, 33.4
DI-24	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.2
DI-25	C	RD2001, Art. 20.1.1.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 36.5
DI-26	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.2
DI-27	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 33.3, 36.2
DI-28	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.4
DI-29	C	RD2011-Class1-Safety-Requirements-Generic, Art. 4.2 RD2011-Class1-Safety-Requirements-Disposal, Art. 34, 43.2, 46
DI-30	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 39.3
DI-31	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 39.3, 46.1
DI-32	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.2
DI-33	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 39.3
DI-34	C	RD2011-Class1-Safety-Requirements-Generic, Art. 7.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 33.2, 33.3
DI-35	A	RD2011-Class1-Safety-Requirements-Generic, Art. 7.3,
DI-36	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.6, 43.2
DI-37	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 39.3
DI-38	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.2, 46.1
DI-39	A	RD2011-Class1-Safety-Requirements-Generic, Art. 8.1
DI-40	C	RD2011-Class1-Safety-Requirements-Generic, Art. 8.2 RD2011-Class1-Safety-Requirements-Disposal, Art. 33.2
DI-41	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 35
DI-42	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.1
DI-43	C	RD2011-Class1-Safety-Requirements-Generic, Art. 10.2, 10.3 RD2011-Class1-Safety-Requirements-Disposal, Art. 41, 46.1
DI-44	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.3
DI-45	C	-
DI-46	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.3
DI-47	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 46.1
DI-48	C	ARD, Art. 5 RD2011-Class1-Safety-Requirements-Disposal, Art. 46.1
DI-49	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 46.1
DI-50	C	RD2011-Class1-Safety-Requirements-Generic, Art. 13.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 33.2.2, 36.3

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-51	C	RD2011-Class1-Safety-Requirements-Generic, Art. 13.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 33.2.1, 36.2
DI-52	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.2, 43.2, 46
DI-53	A	RD2011-Class1-Safety-Requirements-Generic, Art. 15.1, 15.3
DI-54	C	RD2011-Class1-Safety-Requirements-Generic, Art. 4.1, 4.2 RD2011-Class1-Safety-Requirements-Disposal, Art. 39.2, 39.3
DI-55	C	RD2011-Class1-Safety-Requirements-Generic, Art. 5.5, 7.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 36.8, 39.3, 42, 46.1, 46.2
DI-56	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.2, 43.2, 46
DI-57	C	RD2011-Class1-Safety-Requirements-Generic, Art. 9.1, 9.2 RD2011-Class1-Safety-Requirements-Disposal, Art. 38.1, 39.3
DI-58	A	RD2001, Art. 6.9
DI-59	C	ARD, Art. 5.4, 5.7 RD2011-Class1-Safety-Requirements-Generic, Art. 7.6 RD2011-Class1-Safety-Requirements-Disposal, Art. 43.1, 43.3
DI-60	A	RD2011-Class1-Safety-Requirements-Generic, Art. 5.5, 15.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 39.3
DI-61	C	RD2011-Class1-Safety-Requirements-Generic, Art. 5.5, 12.3, 15.1
DI-62	A	RD2011-Class1-Safety-Requirements-Generic, Art. 16,1, 16.2
DI-63	A	RD2011-Class1-Safety-Requirements-Generic, Art. 6.1, 16.2, 16.3
DI-64	C	ARD, Art. 5.1 RD2011-Class1-Safety-Requirements-Generic, Art. 16.5
DI-65	A	RD2011-Class1-Safety-Requirements-Generic, Art. 12.1
DI-66	C	RD2011-Class1-Safety-Requirements-Generic, Art. 12.1, 12.2 RD2011-Class1-Safety-Requirements-Disposal, Art. 41, 46.2
DI-67	A	RD2011-Class1-Safety-Requirements-Generic, Art. 12.1, 12.2
DI-68	C	ARD (Closure confirmation) RD2011-Class1-Safety-Requirements-Disposal, Art. 33.2.2
DI-69	C	ARD, Art. 5.1 RD2011-Class1-Safety-Requirements-Generic, Art. 5.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 35, 43.1, 43.3
DI-70	C	RD2011-Class1-Safety-Requirements-Generic RD2011-Class1-Safety-Requirements-Disposal, Art. 39.3
DI-71	C	RD2011-Class1-Safety-Requirements-Generic, Art. 5.5, 12.3, 15.1, 15.3
DI-72	C	RD2011-Class1-Safety-Requirements-Generic, Art. 5.1, 5.6 RD2011-Class1-Safety-Requirements-Disposal, Art. 42, 46.1, 46.2
DI-73	C	ARD, Art. 21 RD2011-Class1-Safety-Requirements-Disposal, Art. 43.1
DI-74	C	-
DI-75	C	-
DI-76	C	-
DI-77	C	-
DI-78	C	RD2001, Art. 12
DI-79	C	RD2011-Class1-Safety-Requirements-Generic, Art. 6
DI-80	C	RD2011-Class1-Safety-Requirements-Generic, Art. 5.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 35
DI-81	C	-

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-82	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 39.1, 39,3
DI-83	C	ARD, Art. 5.17 RD2011-Class1-Safety-Requirements-Generic, Art. 13.1, 13,.3 RD2011-Class1-Safety-Requirements-Disposal, Art. 33.1, 43.1
DI-84	C	ARD, Art. 5.17 RD2011-Class1-Safety-Requirements-Disposal, Art. 33.1, 43.2
DI-85	C	ARD, Art. 5.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 33, 43
DI-86	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 33.1, 43.2
DI-87	C	ARD, Art. 5.1 RD2011-Class1-Safety-Requirements-Generic, Art. 33 RD2011-Class1-Safety-Requirements-Disposal, Art. 43.1, 43.2
DI-88	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.3, 37.3, 43.2
DI-89	C	ARD, Art. 4.3 RD2011-Class1-Safety-Requirements-Generic, Art. 13.1
DI-90	C	ARD, Art. 5.1, 5.17.5 RD2011-Class1-Safety-Requirements-Generic, Art. 33 RD2011-Class1-Safety-Requirements-Disposal, Art. 35, 43.1, 43.2
DI-91	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 43.2 SAR Guide 6.1 SAR 1.1 and 1.2
DI-92	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 43.2 SAR Guide 6.1 SAR 1.1 and 1.2
DI-93	C	ARD, Art. 5.17.5 RD2011-Class1-Safety-Requirements-Disposal, Art. 33.3, 43.1, 43.2
DI-94	C	ARD, Art. 5.17 RD2011-Class1-Safety-Requirements-Generic, Art. 13.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 43.3
DI-95	C	ARD, Art. 5 RD2011-Class1-Safety-Requirements-Disposal, Art. 43.3
DI-96	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 33.2.2
DI-97	C	ARD, Art. 5 RD2011-Class1-Safety-Requirements-Generic, Art. 4.2, 13.1, 13.3, 15
DI-98	C	RD2011-Class1-Safety-Requirements-Generic, Art. 11, 13.1, 13.3, 14, 15 RD2011-Class1-Safety-Requirements-Disposal, Art. 33.3, 42.3, 43.3
DI-99	A	RD2011-Class1-Safety-Requirements-Generic, Art. 13.1
DI-100	C	RD2001, Art. 20.1.3, 20.1.4 ARD, Art. 5.1.7.7
DI-101	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 43.2
DI-102	C	RD2011-Class1-Safety-Requirements-Generic, Art. 33.2.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 43.1
DI-103	C	ARD, Art. 5.1 (License application) paragraph 4, 5.1 (SAR) paragraph 7.8 RD2011-Class1-Safety-Requirements-Disposal, Art. 33.3, 36.2
DI-104	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 36.2
DI-105	C	RD2011-Class1-Safety-Requirements-Disposal, Art. 34
DI-106	C	RD2011-Class1-Safety-Requirements-Generic, Art. 14.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 44
DI-107	C	RD2011-Class1-Safety-Requirements-Generic, Art. 14.1 RD2011-Class1-Safety-Requirements-Disposal, Art. 44
DI-108	A	RD2011-Class1-Safety-Requirements-Generic, Art. 14.2

References

ARD	Royal Decree of Authorization document
RD2001	General Regulations (20/07/01) for the protection of the public, workers and the environment against the hazards of ionizing radiation
RD2011-Class1-Safety-Requirements-Generic	Royal Decree (30/11/11) implementing generic WENRA WGWD SRLs
RD2011-Class1-Safety-Requirements-Disposal	Royal Decree Disposal (pending formalisation)

Bulgaria

Benchmarking of the implementation of the Disposal Safety Reference Levels (SRLs) within the Bulgarian regulatory framework was performed at the 38th WGWD meeting. The outcomes are presented in the table below.

A total of 25 "C"-rated SRLs have been identified, as follows:
SAFETY AREA: SAFETY MANAGEMENT – 2 "C"-rated SRLs;
SAFETY AREA: DISPOSAL FACILITY DEVELOPMENT – 17 "C"-rated SRLs;
SAFETY AREA: WASTE ACCEPTANCE – 1 "C"-rated SRL;
SAFETY AREA: SAFETY VERIFICATION – 5 "C"-rated SRLs.

Taking into account the comments provided by WGWD during the review of the Bulgarian benchmarking, a draft action plan (AP) has been developed for the incorporation of the requirements of the relevant "C"-rated SRLs into the regulatory framework (see table below).

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	ASUNE, Art. 3. (2) item 1 + Art. 14. (2) & (3) + Art. 16. item 3 RL&P, Art. 23. (2) item 1 + Art. 37. (1) item 1 + Art. 40. (1) item 1 + Art. 48. item 1 + Art. 54. (1) items 1, 2, 3 & 4; (2) & (3) + Art. 57. (2) item 5 + Art. 60. item 1 RRAW, Art. 17. (1) + Art. 21. (3)
DI-02	A	ASUNE, Art. 16 RL&P, Art. 48. item 12 RRAW, Art. 4. (3) + Art. 48. (1)
DI-03	A	ASUNE, Art. 16. 3 RRAW, Art. 39. (2) item 4
DI-04	A	RRAW, Art. 4. (3) + Art. 47. (1) & (2) + Art. 48. (1) & (3) + Art. 52. (1)
DI-05	A	RL&P, Art. 35. (1) 4, 5, 6, 7 & 8 + RRAW, Art. 48. (2) 2
DI-06	A	ASUNE, Art. 3. (2) 1 + Art. 14. (3) RRAW, Art. 44. (1) 4 + Art. 45. (1) & (2)
DI-07	A	ASUNE, Art. 16, item 1 RL&P, Art. 13. (5) & (6) + + Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 9. Chapter IX. Operation, 9.3. Instructions and procedures) + Art. 43. (1) item 10 + Art. 48, items 2 & 9 + Art. 57. (2) item 3 & (3) item 7 + Art. 60. item 5 RRAW, Art. 47. (1), (2) & (3) + Art. 51. (1) & (2)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-08	A	ASUNE, Art. 3. (2) item 1 + Art. 14. (3) RL&P, Art. 13. (3) item 1 RRAW, Art. 5. (1) item 11
DI-09	A	ASUNE, Art. 33. (3) + Art. 35. (2) item 2 RRAW, Art. 4. (3) + Art. 48. (3)
DI-10	A	ASUNE, Art. 16. item 4 RL&P, Art. 13. (2) item 5 + Art. 35. (1) item 8 + Art. 37. (1) item 1, letter "g" + Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 9. Chapter IX. Operation, 9.2. Personnel training and qualification) + Art. 43. (1) items 23 & 24 + Art. 44. (2) item 3 + Art. 48. item 8 + Art. 59 (1) item 15 RRAW, Art. 40. (1) & (2) + RRAW, Art. 61. (2) item 7
DI-11	A	RL&P, Art. 13. (2) item 5 RRAW, Art. 48. (2) item 3
DI-12	A	ASUNE, Art. 16. items 4 & 13
DI-13	A	RL&P, Art. 13. (3) item 1 RRAW, Art. 51. (1) & (2)
DI-14	A	ASUNE, Art. 16. item 1 RRAW, Art. 5. (1) item 9 + Art. 47. (1) & (2) + Art. 49. (4) + Art. 50. item 10 + Art. 52. (1) & (2) + Art. 53. (1)
DI-15	A	RRAW, Art. 47. (3) + Art. 48. (3)
DI-16	A	RL&P, Art. 36. (1) item 3 + Art. 39. (1) item 2 + Art. 41. (1) item 3 + Art. 43. (1) item 6 + Art. 48. item 10 + Art. 59. (1) item 15 + Art. 60. item 4 RRAW, Art. 47. (3) + Art. 53. (1) & (2)
DI-17	A	RRAW, Art. 4. (3) + Art. 47. (1), (2) & (3) + Art. 48. (2) item 2 & (3) + Art. 49. (1), (2), (3) & (4) + Art. 50. items 6 & 7 + Art. 51. (1) & (2) + Art. 53. (1)
DI-18	A	RRAW, Art. 49. (4)
DI-19	A	RL&P, Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 9. Chapter IX. Operation, 9.6. Operational experience feedback system) RRAW, Art. 39. (2) item 4 + Art. 42. item 9 + Art. 61. (2) item 4
DI-20	C	RL&P, Art. 13. (3) item 2 RRAW, Art. 44. (1) item 5 + Art. 50. item 7 AP: Relevant text shall be included under item 7 of Art. 50 of Chapter Ten "Management System" of the RRAW. Relevant text shall be included as a condition in the authorizations for the national near-surface radioactive waste disposal facility, covering construction, commissioning, operation, and closure.
DI-21	C	RL&P, Art. 13. (3) item 2 RRAW, Art. 44. (1) item 5 & (2) + Art. 50. item 7 AP: Relevant text shall be included under item 7 of Art. 50 of Chapter Ten "Management System" of the RRAW. Relevant text shall be included as a condition in the authorization for the closure of the national near-surface radioactive waste disposal facility.
DI-22	A	See the references to DI-99 RRAW, Art. 5. (1) items 3 & 5, (2) + Art. 21. (4)
DI-23	A	RRAW, Art. 22. (1) items 1, 2 & 3, (2), (3) & (4) + Art. 56. (1)
DI-24	A	RRAW, Art. 22. (4)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-25	A	ASUNE, Art. 3. (2) item 4 + Art. 16. item 3 RL&P, Art. 40. (1) item 1, letter “a” + Enclosure 1 to Art. 40 (1) item 1, letter “a” (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 8. Chapter VIII. Radiation protection, 8.2. Optimisation of the radiation protection + 10. Chapter X. Safety analysis of the facility, including accident analysis, 10.6. Demonstration of acceptability of the safety level of the nuclear facility and/or of the need for planning of safety upgrading measures) RRAW, Art. 21. (3)
DI-26	A	RRAW, Art. 17. (2)
DI-27	A	RRAW, Art. 17. (2) & (3)
DI-28	A	RRAW, Art. 37. (2) item 9
DI-29	A	RL&P, Art. 37. (1) items 2 & 4 + Art. 40. (1) item 1, letter “a” + Enclosure 1 to Art. 40 (1) item 1, letter “a” (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 3. Chapter III. Site evaluation, 3.6. Programmes for monitoring and control of site related parameters + 8. Chapter VIII. Radiation protection, 8.6. Programme for radiation monitoring) RRAW, Art. 37. (2) items 3, 4 & 5
DI-30	C	RL&P, Art. 44. (1) & (2) RRAW, Art. 43. (2) item 5 + Art. 44. (2) + Art. 50. items 10 & 11 AP: Relevant text shall be included as a new paragraph 5 of Art. 22 of the RRAW. Relevant text shall be included as a condition in the authorizations for the national near-surface radioactive waste disposal facility, covering construction, commissioning, operation, and closure.
DI-31	C	ASUNE, Art. 16. item 11 + Art. 19. (1) item 10 + Art. 43. (1) item 22 RNPNW, Art 3. (1) + Art. 7. (1) & (2) + Art. 30. (1), (2) & (3) AP: Relevant text shall be included in the RRAW.
DI-32	A	RL&P, Art. 37. (1) items 1, 2 & 4 RRAW, Art. 25. (1), (2) & (3) + Art. 37. (2)
DI-33	C	RL&P, Art. 37. (1) item 1, letters "d" & "e" RRAW, Art. 23 AP: The reference shall be supplemented by the text of the Art. 26 of the RRAW. Relevant text shall be included as a new paragraph 6 of Art. 26 of the RRAW.
DI-34	A	RRAW, Art. 37. (1) & (2) items 1 - 11
DI-35	A	RRAW, Art. 27
DI-36	A	See the references to DI-99 RL&P, Art. 40. (1) item 1, letter “a” + Enclosure 1 to Art. 40 (1) item 1, letter “a” (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 14. Chapter XIV. Safety analysis after closure – for nuclear facilities for RAW disposal) RRAW, Art. 31. (1), (2), (3), (4) & (5)
DI-37	A	RRAW, Art. 8 + Art. 31. (1), (2), (3), (4) & (5)
DI-38	A	RRAW, Art. 17. (1), (2) & (3) + Art. 37. (1) & (2) items 6, 7 & 11
DI-39	A	RRAW, Art. 28. (2)
DI-40	A	RRAW, Art. 32. (1), (2), (3), (4) & (5)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-41	C	AP: The reference shall be supplemented by the following provisions: ASUNE, Art. 44. (1); RL&P, Art. 37. (1) item 3 + Art. 39. (1) item 3 + Art. 60. item 6
DI-42	C	RRAW, Art. 26. (1) item 3 + Art. 37. (2) items 3, 4, 5, 7, 10 & 11 AP: Relevant text shall be included under Art. 37, paragraph 2, item 3 of the RRAW.
DI-43	A	RRAW, Art. 32. (1), (2), (3), (4) & (5) + Art. 33. (1)
DI-44	A	RL&P, Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 3. Chapter III. Site evaluation, 3.6. Programmes for monitoring and control of site related parameters)
DI-45	A	RRAW, Art. 5. (1) item 2 + Art. 17. (2)
DI-46	C	RRAW, Art. 31. (1) + Art. 32. (2) & (3) AP: Relevant text shall be included under Art. 28, paragraph 2 of the RRAW, or Art. 28, paragraph 2 shall be amended to reflect the requirements of this reference level, with regard to equipment.
DI-47	A	RL&P, Art. 37. (1) items 2 & 4 + Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 3. Chapter III. Site evaluation, 3.6. Programmes for monitoring and control of site related parameters)
DI-48	A	RL&P, Art. 37. (1) item 2 + Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 3. Chapter III. Site evaluation, 3.6. Programmes for monitoring and control of site related parameters + 8. Chapter VIII. Radiation protection, 8.6. Programme for radiation monitoring)
DI-49	C	ASUNE, Art. 16. item 2 RRAW, Art. 43. (2) item 17 + Art. 44. (2) + Art. 59. (1) AP: Relevant text shall be included as a new paragraph 4 of Art. 17 of the RRAW. Relevant text shall be included as a condition in the authorizations for the national near-surface radioactive waste disposal facility, covering construction, commissioning, operation, and closure.
DI-50	A	RL&P, Art. 34. (6) + Art. 41. (1) item 2
DI-51	C	RRAW, Art. 26. (5) AP: Relevant text shall be included in Section IV "Construction and Commissioning" of Chapter Nine "Radioactive Waste Management Facilities" of the RRAW. Relevant text shall be included as a condition in the construction permit for the national near-surface radioactive waste disposal facility.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-52	C	RL&P, Art. 37. (1) items 2 & 4 + Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 3. Chapter III. Site evaluation, 3.6. Programmes for monitoring and control of site related parameters + 8. Chapter VIII. Radiation protection, 8.6. Programme for radiation monitoring) AP: Relevant text shall be included in Section IV "Construction and Commissioning" of Chapter Nine "Radioactive Waste Management Facilities" of the RRAW. Relevant text shall be included as a condition in the construction permit for the national near-surface radioactive waste disposal facility.
DI-53	C	ASUNE, Art. 15 (4) item 5 RL&P, Art. 56. (2) + Art. 57. (1), (2) & (3) RRAW, Art. 50. item 10 AP: Relevant text shall be included in Chapter Ten "Management System" of the RRAW. Relevant text shall be included as a condition in the authorizations for the national near-surface radioactive waste disposal facility, covering construction, commissioning, operation, and closure.
DI-54	A	RRAW, Art. 4. (4) + Art. 39. (1) + Art. 41. (2) & (3)
DI-55	A	RRAW, Art. 5. (3) + Art. 42. items 5, 8 & 10
DI-56	A	RRAW, Art. 42. items 1 & 2 + Art. 61. (1) & (2) items 1 & 2
DI-57	A	RRAW, Art. 41. (2), (3) + (4)
DI-58	A	RL&P, Art. 43. (1) item 4 + Art. 54. (1) item 2 & 3 RRAW, Art. 38. (2)
DI-59	A	RL&P, Art. 54. (1) item 4, (2) & (3)
DI-60	C	RL&P, Art. 57. (2) items 3, 5 & 6 RRAW, Art. 56. (2) & (3) + Art. 61. (1) AP: Relevant text shall be included as a new item 13 in Article 42 of Section V "Operation" of Chapter Nine "Radioactive Waste Management Facilities" of the RRAW. Relevant text shall be included as a condition in the authorizations for the national near-surface radioactive waste disposal facility, covering construction, commissioning, operation, and closure.
DI-61	A	RRAW, Art. 41. (3) + Art. 49 (3) & (4) + Art. 50. item 10
DI-62	C	ASUNE, Art. 118. (1) & (2) + Art. 119 RL&P, Art. 43. (1) item 25 RRAW, Art. 42. item 10 AP: The reference shall be supplemented by the following provisions: ASUNE, Art. 117. (1) & (2). item 1 + Art. 118. (2); REPEPNRE, Art. 2. (1) + Art. 7. (1) + Art. 8. (3) + Art. 11. (2). item 1 + Art. 16. (1) item 3.
DI-63	A	RL&P, Art. 48. item 14 REPEPNRE, Art. 7. (1) & (2) + Art. 8. (1) & (2)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-64	C	RL&P, Art. 43. (1) item 25 REPEPNRE, Art. 11. (3) + Art. 43. items 1, 2 & 3 + Art. 44. (1) & (2) AP: The reference shall be supplemented by the following provisions: ASUNE, Art. 120 (1) & (3); RL&P, Art. 43 (1) item 25 + Art. 48, item 14 + Art. 59, item 17; REPEPNRE, Art. 11. (3) + Art. 44. (1) + Art. 45. (1) + Art. 46. (1), (2), (3) & (4).
DI-65	A	RL&P, Art. 48. items 4 & 5 RRAW, Art. 42. item 6
DI-66	C	RRAW, Art. 50. item 7 AP: Relevant text shall be included under item 6 of Art. 42 of Chapter Nine "Radioactive Waste Management Facility", Section V "Operation" of the RRAW. Relevant text shall be included as a condition in the authorizations for the national near-surface radioactive waste disposal facility, covering commissioning, operation, and closure.
DI-67	C	RRAW, Art. 39. (2) item 4 & (3) + Art. 42. items 6 & 9 AP: Relevant text shall be included under item 6 of Art. 42 of Chapter Nine "Radioactive Waste Management Facility", Section V "Operation" of the RRAW. Relevant text shall be included as a condition in the authorizations for the national near-surface radioactive waste disposal facility, covering commissioning, operation, and closure.
DI-68	A	RRAW, Art. 44. (1) item 3 & (2)
DI-69	C	RRAW, Art. 43. (1) & (2) items 1 - 19 + Art. 44. (1) items 1, 4, (2) AP: Relevant provisions concerning the closure of RAW disposal facilities shall be included in Chapter Two, "Licenses and Permits for Activities in Nuclear Facilities and for Transactions Involving Nuclear Facilities and Nuclear Material", Section "License for the Decommissioning of a Nuclear Facility" of the RL&P. Relevant text shall be included as a new item 20 in Art. 43 (2) of the RRAW. The text of Art. 44 (1), item 5 of the RRAW shall be reformulated so as to reflect the requirements of this reference level.
DI-70	A	RRAW, Art. 43. (1) & (2) items 1 - 19 + Art. 44. (1) & (2)
DI-71	A	RRAW, Art. 43. (1) & (2) item 8
DI-72	A	RRAW, Art. 45. (1) & (2) + Art. 46. (1) items 1 & 2
DI-73	C	RL&P, Article 62a. (1) & (2) RRAW, Art. 45. (1) & (2) + Art. 43. (2) item 17 AP: Relevant text concerning the termination of the authorization for the closure of radioactive waste disposal facilities (see AP for DI-69) and the release of the licensee from liability, reflecting the requirements of this reference level, shall be included in Chapter Two "Licenses and permits for activities in nuclear facilities and for transactions involving nuclear facilities and nuclear material", Section "License for the decommissioning of a nuclear facility" of the RL&P.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-74	A	RL&P, Art. 37. (1) item 1 + Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 6. Chapter VI. RAW management - for the nuclear facilities with RAW generation or intended for RAW management, 6.2. Criteria for RAW acceptance at the facility and requirements to the packages) RRAW, Art. 19 + Art. 37. (2) item 1 + Art. 30. item 1 + Art. 61. (1) & (2) item 8
DI-75	A	See the references to DI-99, DI-106, and DI-107 RRAW, Art. 19
DI-76	A	RRAW, Art. 19. items 1, 2, 3, 4, 5, 6, 7, 8, 9 & 10
DI-77	A	RRAW, Art. 13. (3) item 1, (4) & (5) + Art. 19. items 1, 2, 3, 4, 5, 6, 7, 8, 9 & 10
DI-78	A	See the references to DI-99, DI-106, and DI-107 RRAW, Art. 61. (1) & (2) item 8
DI-79	A	RRAW, Art. 5. (1) items 7 & 12 + Art. 13. (5) + Art. 20 + Art. 50. items 2, 3, 4 & 5 RSERAW, Art. 5. (1), (2), (3) & (4) + Art. 8 + Annex 2 + Annex 3
DI-80	A	RRAW, Art. 19. item 9 + Art. 50. items 6 & 7
DI-81	C	RRAW, Art. 5. (1) item 12 + Art. 11. (3) + Art. 13. (4) & (5) + Art. 20 + Art. 50. items 3 & 4 RSERAW, Art. 5. (1), (2), (3) & (4) + Art. 8. + Annexes 1, 2 & 3 3 AP: Relevant text shall be included under paragraph 2 of Art. 51 in the Chapter ten "Management System" of the RRAW. Relevant text shall be included as a condition in both the commissioning permit and the operating license for the national near-surface radioactive waste disposal facility.
DI-82	A	RRAW, Art. 5. (1) item 12 + Art. 20 + Art. 50. items 3 & 4
DI-83	A	RL&P, Art. 23. (2) item 1 + Art. 37. (1) item 1 + Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 14. Chapter XIV. Safety analysis after closure – for nuclear facilities for RAW disposal) + Art. 48. item 1 + Art. 54. (3) + Art. 57. (2) item 5 + Art. 60. item 1 RRAW, Art. 44. (2) + Art. 54. (1) + Art. 56. (2) & (3) + Art. 61. (1)
DI-84	A	RRAW, Art. 54. (1) & (3) + Art. 55. (1)
DI-85	A	RRAW, Art. 5. (2) + Art. 37. (1) + Art. 41. (3) + Art. 43. (2) item 17. + Art. 44. (2) + Art. 54. (1) & (2)
DI-86	C	RRAW, Art. 28. (1) item 1 + Art. 54. (1), (2) & (3) RL&P, Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 14. Chapter XIV. Safety analysis after closure – for nuclear facilities for RAW disposal) AP: Relevant text shall be included under a new paragraph 4 of Art. 54 in the Chapter Eleven "Safety Assessment" of the RRAW.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-87	A	See the references to DI-83 RL&P, Art. 23. (2) item 1 + Art. 37. (1), 1 + Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 14. Chapter XIV. Safety analysis after closure – for nuclear facilities for RAW disposal) + Art. 48. item 1 + Art. 54. (3) + Art. 57. (2) item 5 + Art. 60. item 1 RRAW, Art. 61. (2)
DI-88	A	RRAW, Art. 26. (1) item 6 + Art. 28. (1) item 3 + Art. 60. (2) & (3)
DI-89	A	See the references to DI-83 & DI-87 RRAW, Art. 55. (1) + Art. 61. (3)
DI-90	A	RRAW, Art. 54. (1) & (2) + Art. 55. (1) & (2) item 3 + Art. 57. (1) & (2) + Art. 58. (1), (2) & (3) + Art. 59. (1) & (2) + Art. 60. (1) + Art. 61. (3)
DI-91	A	RRAW, Art. 26. (1) items 1, 2, 3, 4, 5 & 6, (2), (3), (4) & (5) + Art. 31. (1), (2), (3), (4) & (5)
DI-92	A	RRAW, Art. 47. (1) + Art. 59. (1) & (2)
DI-93	A	RL&P, Art. 40. (1) item 1, letter "a" + Enclosure 1 to Art. 40 (1) item 1, letter "a" (Structure of the Safety Analysis Report (SAR) of a Nuclear Facility, 8. Chapter VIII. Radiation protection, 8.2. Optimisation of the radiation protection) RRAW, Art. 5. (2) + Art. 61. (3)
DI-94	A	RL&P, Art. 54. (1) item 4, (2) & (3) RRAW, Art. 43. (1) & (2) item 17 + Art. 44. (1) & (2)
DI-95	A	RL&P, Art. 36. (1) item 3 + Art. 39. (1) item 2 + Art. 41. (1) item 3 + Art. 43. (1) item 6 + Art. 48.item 10 + Art. 59. item 15 RRAW, Art. 43. (2) item 12 + Art. 47. (1), (2) & (3)
DI-96	C	RRAW, Art. 5. (1) item 3 + Art. 55. (1) & (2) items 1, 2 & 3 AP: The reference shall be supplemented by the provisions of Art. 57. (1) & (2) + Art. 58. (1), (2) & (3) + Art. 59. (1) & (2) + Art. 60. (1), (2) & (3) of Chapter Eleven "Safety Assessment" of the RRAW.
DI-97	A	See the references to DI-83 RL&P, Art. 10. (1) & (2) RRAW, Art. 56. (2) & (3)
DI-98	A	See the references to DI-97 RL&P, Art. 23. (2) item 1, letters "a", "b" & "d", items 2, 3, 4, 5, 6 & 7 RRAW, Art. 61. (1) & (2) items 1, 2, 3, 4 & 8
DI-99	A	RL&P, Art. 23. (2) item 1 + Art. 57. (2) items 1, 2, 3, 4, 5, 6 & 7 RRAW, Art. 56. (2)
DI-100	A	RRAW, Art. 54. (2) & (3)
DI-101	C	RRAW, Art. 60. (1), (2) & (3) AP: The reference shall be supplemented by the provisions of Art. 59 (2) of Chapter Eleven "Safety Assessment" of the RRAW.
DI-102	A	RRAW, Art. 22. (1) items 1, 2 & 3, (2), (3) & (4) + Art. 56. (1)
DI-103	A	RRAW, Art. 60. (1)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-104	C	RRAW, Art. 5. (1) item 4 + Art. 37. (1) & (2) item 6 AP: The reference shall be supplemented by the provisions of Art. 59 (2) of Chapter Eleven "Safety Assessment" of the RRAW. The provisions of Art. 59 (2) shall be supplemented by additional text addressing the management of uncertainties.
DI-105	A	RRAW, Art. 60. (1)
DI-106	A	ASUNE, Art. 15 (3) items 1 & 8 + Art. 20. (1) RL&P, Art. 3. (2) item 3 + Art. 10. (1) & (2) + Art. 26. (1) RRAW, Art. 56. (2) & (3) + Art. 61. (1)
DI-107	C	RRAW, Art. 56. (3) + Art. 61. (2) items 1, 2, 3, 4, 6, 8 & 10 AP: Relevant text shall be included under item 10 of Art. 61. (2), Chapter Eleven "Safety Assessment" of the RRAW. Relevant text shall be included under a new item 11 of Art. 61. (2), Chapter Eleven "Safety Assessment" of the RRAW. The assumptions are also related to the identification and management of uncertainties.
DI-108	A	RRAW, Art. 61. (3)

Czech Republic

Benchmarking of implementation of the Disposal SRLs in the Czech Republic framework was initiated at WENRA WGWD meeting 39, and supplemented during WGW meeting 41, and the result is reflected in the table below.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	Article 4 (2), Article 5 (1, 2, 4) (263/2016 Coll.)
DI-02	A	Article 49 (1) (263/2016 Coll.)
DI-03	A	Article 5 (7) (263/2016 Coll.) Article 13 (2) (162/2017 Coll.)
DI-04	A	Articles 5 (2), 29 (1), 30 (4) (263/2016 Coll.) Article 14 (408/2016 Coll.)
DI-05	A	Article 29 (5) (263/2016 Coll.)
DI-06	A	Article 111 (1) (263/2016 Coll.)
DI-07	A	Articles 5 (4), 29 (1), 30 (4) (263/2016 Coll.)
DI-08	A	Article 14 (408/2016 Coll.)
DI-09	A	Article 14 (408/2016 Coll.)
DI-10	A	Article 49 (1) (263/2016 Coll.) Article 7 (1, 2) (408/2016 Coll.)
DI-11	A	Article 49 (1) (263/2016 Coll.)
DI-12	A	Article 49 (1) (263/2016 Coll.)
DI-13	A	Article 30 (4) (263/2016 Coll.), Article 14 (408/2016 Coll.)
DI-14	A	Articles 3 (1, 3, 5), 13 (1), 15 (1) (408/2016 Coll.)
DI-15	A	Article 29 (1, 3) (263/2016 Coll.)
DI-16	A	Article 29 (1) (263/2016 Coll.) Article 15 (408/2016 Coll.)
DI-17	A	Article 29 (1, 3, 5) (263/2016 Coll.) Article 14 (408/2016 Coll.)
DI-18	A	Article 5 (1) (408/2016 Coll.)
DI-19	A	Article 5 (7) (263/2016 Coll.) Article 22 (7) (21/2017 Coll.)
DI-20	A	Articles 24 (4), 29 (1, 3), 47 (3) 112 (1) (263/2016 Coll.) Article 10 (1) (377/2016 Coll.)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-21	A	Article 112 (1) (263/2016 Coll.)
DI-22	A	Article 5 (1) (263/2016 Coll.)
DI-23	A	Article 19 (1) (329/2017 Coll.) Article 6 (1) (V Projekt)
DI-24	A	Article 3 (2) (263/2016 Coll.) Article 19 (1) (329/2017 Coll.)
DI-25	A	Articles 2 (2), 62 (263/2016 Coll.)
DI-26	A	Article 9 (2) (377/2016 Coll.) Articles 18 (1), 19(1) (378/2016 Coll.)
DI-27	A	Article 9 (1, 2) (377/2016 Coll.)
DI-28	B	Article 7 (377/2016 Coll.)
DI-29	A	Article 3 (1, 2) (162/2017 Coll.)
DI-30	A	Article 7 (377/2016 Coll.)
DI-31	A	Article 7 (377/2016 Coll.)
DI-32	A	Article 4 (1) (378/2016 Coll.)
DI-33	A	Article 47 (3) (263/2016 Coll.) Article 9 (7) (377/2016 Coll.) Article 4 (2) (378/2016 Coll.)
DI-34	A	Article 9 (6) (377/2016 Coll.) Article 19 (1) (329/2017 Coll.)
DI-35	A	Article 10 (1) (329/2017 Coll.)
DI-36	A	Article 19 (1) (329/2017 Coll.)
DI-37	A	Article 19 (1) (329/2017 Coll.)
DI-38	A	Article 45 (3) (263/2016 Coll.) Article 48 (4) (329/2017 Coll.)
DI-39	A	Article 46 (2) (263/2016 Coll.)
DI-40	A	Article 46 (3) (263/2016 Coll.)
DI-41	B	“Not applicable”
DI-42	A	Article 19 (1) (329/2017 Coll.)
DI-43	A	Article 49 (1) (263/2016 Coll.) Article 29 (1) (328/2017) Article 19 (1) (329/2017 Coll.) Article 7 (358/2016 Coll.)
DI-44	A	Article 19 (2) (329/2017 Coll.)
DI-45	A	Article 19 (1) (329/2017 Coll.)
DI-46	A	Article 46 (1) (263/2016 Coll.) Article 4 (1) (329/2017 Coll.)
DI-47	A	Article 47 (263/2016 Coll.)
DI-48	A	Annex 1 (263/2016 Coll.)
DI-49	A	Articles 66 (4), 106 (4) (263/2016 Coll.) Article 8 (3) (377/2016 Coll.)
DI-50	A	Article 119 Section (2) (183/2006 Coll.)
DI-51	A	Article 18 (378/2016 Coll.)
DI-52	A	Article 8, Section (3), letter c) 1 (377/2016 Coll.)
DI-53	A	Article 9 (1) (263/2016 Coll.)
DI-54	A	Article 9 (1) (263/2016 Coll.)
DI-55	A	Articles 48 (4), 49(1) (263/2016 Coll.)
	A	
DI-56	A	Article 8 (3) (377/2016 Coll.)
DI-57	A	Annex 1 (263/2016 Coll.)
DI-58	A	Article 9 (1, 3) Annex 1(263/2016 Coll.)
DI-59	A	Article 9 (3) (377/2016 Coll.)
DI-60	A	Articles 9 (1), 49 (1) (263/2016 Coll.)
DI-61	A	Article 9 (1) (263/2016 Coll.)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-62	A	Articles 5 (1), 49 (1), 151, 153 (2), 156 (2) Annex 1(263/2016 Coll.)
DI-63	A	Article 156 (2) (263/2016 Coll.) Article 5 (359/2016 Coll.)
DI-64	A	Articles 49 (1), 156 (2) Annex 1(263/2016 Coll.), Articles 12 (6), 18 (1) (359/2016 Coll.)
DI-65	A	Article 49 (1), Annex 1 (263/2016 Coll.),
DI-66	A	Article 48 (1, 4) Annex 1 (263/2016 Coll.) Article 18 (1) (21/2017 Coll.), Articles 19 (1, 3) (329/2017 Coll.)
DI-67	A	Annex 1 263/2016 Coll.), Article 17 (1, 2) (162/2017 Coll.)
DI-68	A	Article 9 (3) (263/2016 Coll.), Article 9 (1) (377/2016 Coll.)
DI-69	A	Annex 1, Part 3. (263/2016 Coll.) Article 12 (374/2016 Coll.) Articles 8 (4), 10 (1), 12 (1) (377/2016 Coll.)
DI-70	A	Article 9 (1) (263/2016 Coll.)
DI-71	A	Article 5 (8) (263/2016 Coll.)
DI-72	A	Article 9 (1) (263/2016 Coll.)
DI-73	A	Articles 3 (2), 105 (2), Annex 7 (263/2016 Coll.)
DI-74	A	Article 9 (3) (377/2016 Coll.), Article 20 (378/2016 Coll.) Annex 1 263/2016 Coll.)
DI-75	A	Article 9 (3) (377/2016 Coll.), Annex 1 (263/2016 Coll.),
DI-76	A	Article 9 (3) (377/2016 Coll.)
DI-77	A	Article 9 (5) (377/2016 Coll.)
DI-78	A	Article 24 (6) (263/2016 Coll.), Articles 9 (3) (377/2016 Coll.), Annex 1 (263/2016 Coll.)
DI-79	A	Article 8 (2, 3) (377/2016 Coll.)
DI-80	A	Article 8 (377/2016 Coll.)
DI-81	A	Article 8 (377/2016 Coll.)
DI-82	A	Article 8 (377/2016 Coll.)
DI-83	A	Article 9 (1) (377/2016 Coll.), Article 48 (1) (263/2016 Coll.)
DI-84	A	Annex 1 (263/2016 Coll.)
DI-85	A	Article 10 (329/2017 Coll.), Annex 1 (263/2016 Coll.)
DI-86	A	Article 4 (162/2017 Coll.), Article 25 (1) (263/2016 Coll.), Article 10 (4) (329/2017 Coll.), Article 9, Section (1) (377/2016 Coll.)
DI-87	A	Article 9 (1) (377/2016 Coll.), Annex 1 (263/2016 Coll.)
DI-88	A	Article 9 (1) (377/2016 Coll.), Article 8 (263/2016 Coll.)
DI-89	A	Articles 14, 15 (1) (408/2016 Coll.), Annex 1 (263/2016 Coll.)
DI-90	A	Articles 14, 15 (1) (408/2016 Coll.), Annex 1 (263/2016 Coll.)
DI-91	A	Article 9 (1) (377/2016 Coll.)
DI-92	A	Article 9 (2) (377/2016 Coll.),
DI-93	A	Article 62, Annex 1 (263/2016 Coll.)
DI-94	A	Article 14 (5) (162/2017 Coll.), Article 48 (1) (263/2016 Coll.), Annex 1 (263/2016 Coll.)
DI-95	A	Annex 1 (263/2016 Coll.)
DI-96	A	Article 5 (8) (263/2017 Coll.)
DI-97	A	Articles 3 (1, 3), 13 (2) 14 Section 1 (162/2017 Coll.)
DI-98	A	Articles 22, Sections (2, 7), 24 Section (1) (162/2017 Coll.), Article 229 (1),
DI-99	A	Annex 1 (263/2016 Coll.)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-100	A	Article 66 (3), Annex 1 (263/2016 Coll.) Article 9 (1) (377/2016 Coll.)
DI-101	A	Article 9 (1) (377/2016 Coll.)
DI-102	A	Articles 43, 45 (1) (263/2016 Coll.)
DI-103	A	Article 9 (2) (377/2016 Coll.)
DI-104	A	Article 9 (2) (377/2016 Coll.)
DI-105	A	Article 9 (2) (377/2016 Coll.)
DI-106	A	Articles 48 (2), 54 (1) (263/2016 Coll.)
DI-107	A	Articles 13 (1, 2, 4), 18, 20 (162/2017 Coll.)
DI-108	A	Article 21 (5) (162/2017 Coll.)

References

1.	Decree No. 183/2006 Coll., on site planning and builiding code (Building Act)
2.	Act No. 263/2016 Coll. of 14 July 2016, Atomic Act
3.	Decree No. 377/2016 Coll. of 18 November 2016, on the requirements for the safe management of radioactive waste and on the decommissioning of nuclear installations or category III or IV workplaces
4.	Decree No. 378/2016 Coll. of 18 November 2016, on siting of nuclear installation
5.	Decree No. 408/2016 Coll., on management system
6.	Decree No. 21/2017 Coll., on assurance of nuclear safety of nuclear installations
7	Decree No. xx/2017 Coll., on the requirements for nuclear installation design (V Proj)
8	Decree No.162/2017 Coll., on requirements for safety assessment according to the Atomic Act

Finland

Benchmarking of implementation of the Disposal SRLs in the Finnish framework was initiated at WENRA WGWD meeting 38, and supplemented during WGWD meeting 39, and the result is reflected in the table below.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	Nuclear Energy Act (NEA) Sections 9, 32, 33
DI-02	A	NEA Section 7 a, YVL A.3 301, Y/4/2016 Sections 25, 31, 33
DI-03	A	Y/4/2016 Section 25 1
DI-04	A	YVL A.3, 107, 322, 323
DI-05	A	YVL A.3 501
DI-06	A	NEA Section 32, 33
DI-07	A	YVL A.3 301, 307
DI-08	A	YVL A.3 401, 402
DI-09	A	YVL A.3 302, 310, 322, 323
DI-10	A	YVL A.4 301, 302, 308
DI-11	A	YVL A.3 508, YVL A.4 331
DI-12	A	YVL A.4 306, 316
DI-13	A	YVL A.3 505
DI-14	A	NEA Section 7 a, YVL A.3 301, 310, 323, 601, 605, 607, Y/4/2016 Section 38
DI-15	A	YVL A.3 202

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-16	A	YVL A.3 202, 607, 701
DI-17	A	YVL A.3 302, 307, 308, 322, 328, 402, 602, 605, 607, 613
DI-18	A	YVL A.3 605
DI-19	A	Y/4/2016 Section 25
DI-20	A	YVL D.5 706, YVL A.9, YVL D.5 815, Y/4/2016 Section 29
DI-21	A	YVL D.5 706, YVL A.9, YVL D.5 815, Y/4/2016 Section 29
DI-22	A	NEA Section 7 a, NED 6 §, RA Section 2
DI-23	A	STUK Y/4/2016: Sections 13, 30
DI-24	A	NEA Section 7 h, STUK Y/4/2016: Sections 13, 30,
DI-25	A	NEA Sections 6, 7 h, RASection 2, Y/4/2016 21 §
DI-26	A	Y/4/2016 Sections 4, 21, 32
DI-27	A	Y/4/2016 Sections 4, 10, 31, 32, 36
DI-28	B	*Not applicable*
DI-29	A	YVL D.5 506, Y/4/2016 Section 33
DI-30	A	Y/4/2016 Section 29
DI-31	B	*Not applicable*
DI-32	A	YVL D.5 506, Y/4/2016 Section33
DI-33	A	YVL D.5 402, 608, Y/4/2016 35
DI-34	A	Y/4/2016 Sections 3, 16, 35
DI-35	A	Y/4/2016 Sections 3, 16, 35
DI-36	A	Y/4/2016 Section 35
DI-37	A	Y/4/2016 Section 4
DI-38	A	Y/4/2016 Sections 9, 10, 30, 32, 35
DI-39	A	Y/4/2016 Section 5
DI-40	A	Y/4/2016 Section 5
DI-41	A	NEA Sections 32, 57
DI-42	A	Y/4/2016 Sections 30, 31, 32, Y/4/2016 Section 16
DI-43	A	Y/4/2016 Sections 6, 27
DI-44	A	Y/4/2016 Section 33
DI-45	A	Y/4/2016 Section 15
DI-46	A	Y/4/2016 Section 15
DI-47	A	YVL D.5 402, 608, Y/4/2016 35
DI-48	A	Y/4/2016 Section 33
DI-49	A	YVL C.7 301, 401, D.5 506, Y/4/2016 Section 33
DI-50	A	Y/4/2016 Section 22
DI-51	A	Y/4/2016 Section 31
DI-52	A	YVL D.5 506
DI-53	A	NEA Section 7 a, NED Section 112
DI-54	A	Y/4/2016 Sections 8, 26
DI-55	A	Y/4/2016 Sections 13, 15
DI-56	A	YVL D.5 506
DI-57	A	Y/4/2016 Section 26
DI-58	A	NEA Section 20, 36, Y/4/2016 Section 23

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-59	A	NEA Section 20
DI-60	A	NED Section 112
DI-61	A	NEA Section 7a, NED Section 112
DI-62	A	STUK Y/2/2016 Sections 3, 4
DI-63	A	Y/2/2016 Sections 4, 6, 8, 11
DI-64	A	NED Section 36, Y/2/2016 Section 8
DI-65	A	Y/4/2016 Sections 24, 27
DI-66	A	YVL A.8 705, 722, Y/4/2016 Sections 6, 25
DI-67	A	YVL A.8 722, Y/4/2016 Section 25
DI-68	A	Y/4/2016 Section 21
DI-69	A	YVL A.1, YVL D.4 507, 605, 718, YVL D.5 603, 706, 815, Y/4/2016 Section 29
DI-70	A	Y/4/2016 Section 20, 21
DI-71	A	NEA Section 7 g, NED Section 112
DI-72	A	NEA Sections 7h, 32
DI-73	A	NED Section 85, YVL D.4 718, YVL D.5 815
DI-74	A	Y/4/2016 Section 16, YVL D.5 705
DI-75	A	YVL D.5 705, 706
DI-76	A	YVL D.5 705, Y/4/2016 Section 16
DI-77	A	YVL D.4 402, Y/4/2016 Section 8
DI-78	A	YVL A.1 B23, YVL D.5 706
DI-79	A	YVL D.5 705
DI-80	A	YVL D.5 603
DI-81	A	YVL D.4 504
DI-82	A	YVL D.4 504
DI-83	A	YVL D.5 706
DI-84	A	YVL D.5 706, Y/4/2016 Sections 9, 10
DI-85	A	YVL D.5 706
DI-86	A	STUK Y/4/2016 Section 3, 4, 35
DI-87	A	YVL D.5 706, YVL A.1 Chapter A.2, Y/4/2016 Section 35
DI-88	A	Y/4/2016 Sections 11, 35
DI-89	A	Y/4/2016 Sections 3, 36
DI-90	A	Y/4/2016 Sections 3, 36
DI-91	A	Y/4/2016 Sections 3, 36
DI-92	A	Y/4/2016 Sections 3, 36
DI-93	A	NEA Section 7 a, RA Section 2
DI-94	A	NED Section 85, Y/4/2016 Section 21
DI-95	A	Y/4/2016 Section 38
DI-96	A	NEA Section 7 a, Y/4/2016 Section 35
DI-97	A	Y/4/2016 Sections 3, 4, 37, YVL A.1 385
DI-98	A	NED Sections 32, 36, YVL A.1 387, Y/4/2016 Section 4, 25, 37
DI-99	A	Y/4/2016 Sections 4, 37
DI-100	A	Y/4/2016 Section 9
DI-101	A	Y/4/2016 Section 35

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-102	A	Y/4/2016 Section 30
DI-103	A	Y/4/2016 Section 4
DI-104	A	Y/4/2016 Section 32
DI-105	A	Y/4/2016 Section 36
DI-106	A	YVL D.5 708,
DI-107	A	YVL A.1 353, YVL D.5 602, 708
DI-108	A	YVL A.1 353, YVL D.5 602, 708

References

NEA	Nuclear Energy Act 990/1987
NED	Nuclear Energy Decree 161/1988
RA	Radiation Act 592/1991
YVL A.3	Guide YVL A.3 Management system for a nuclear facility
YVL A.4	Guide YVL A.4 Organisation and personnel of a nuclear facility
YVL A.8	Guide YVL A.8 Ageing management of a nuclear facility
YVL A.9	Guide YVL A.9 Regular reporting on the operation of a nuclear facility
YVL A.10	Guide YVL A.10 Operating experience feedback of a nuclear facility
YVL B.1	Guide YVL B.1 Safety design of a nuclear power plan
YVL C.7	Guide YVL C.7 Radiation monitoring in areas surrounding nuclear facilities
YVL D.4	Guide YVL D.4 Predisposal management of low and intermediate level waste and decommissioning of a nuclear facility
YVL D.5	Guide YVL D.5 Disposal of nuclear waste

France

Since the publication of the WGWD Safety Reference Levels for radioactive waste disposal in December 2014, France has continued to fulfil its obligations to implement necessary changes into its national regulations. The ministerial order of February 7, 2012 setting general rules relative to nuclear installations was published and entered into effect on July 1, 2013. This order was an important update of the French regulatory framework and allowed to transpose directly a number of safety reference levels identified by WENRA, such as those related to safety policy, integrated management system and safety verification. Additionally, this ministerial order includes dedicated sections on waste management and disposal facilities. However, this ministerial order sets generic requirements that had to be further developed in regulatory decisions to be issued by ASN. Thus, several decisions have been developed by ASN, some of which being specific to waste management. The drafting process includes different steps of consultation of stakeholders.

At the 35 WGWD meeting in 2015, France reported its regulatory implementations for benchmarking, relying on dispositions of the Ministerial order of 7th February and on early drafts of the decisions under validation which are now entered into effect. The result of the benchmarking is reflected in the table below.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	Environmental code: Art L. 593-6 & L. 593-7 MO of 7/2/2012: Art 8.5.1
DI-02	A	MO of 7/2/2012: Art 2.3.1
DI-03	A	MO of 7/2/2012: Art 2.3.1 & 2.7.2
DI-04	A	MO of 7/2/2012: Art 1.2 & 2.3.1
DI-05	A	Environmental code: Art L. 594-1 to 594-4, L. 593-7, R. 593-16 MO of 7/2/2012: Art 2.1.2
DI-06	A	Environmental code: Art R. 593-69 & R. 593-75
DI-07	A	MO of 7/2/2012: Art 2.2.1 to 2.2.4, 2.3.2, 2.4.1
DI-08	A	Resolution n°2017-DC-0587 of 23/3/2017: Title III Resolution n°2015-DC-0508 of 21/4/2015: Art 2.2.1
DI-09	A	MO of 7/2/2012: Art 2.3.1 & 2.3.2
DI-10	A	MO of 7/2/2012: Art 2.5.2 & 2.5.6
DI-11	A	MO of 7/2/2012: Art 2.5.2
DI-12	A	MO of 7/2/2012: Art 2.5.5
DI-13	A	MO of 7/2/2012: Art 2.2.3 & 2.5.5
DI-14	A	MO of 7/2/2012: Art 2.4.1 & 2.4.2
DI-15	A	MO of 7/2/2012: 2.4.1, 2.5.3, 2.5.4
DI-16	A	MO of 7/2/2012: 2.4.1 & 2.4.2
DI-17	A	MO of 7/2/2012: Art 2.2.1 to 2.2.4, 2.3.1, 2.4.1, 2.4.2, 2.5.5
DI-18	A	MO of 7/2/2012: Art 2.5.6
DI-19	A	MO of 7/2/2012: Art 2.7.2 & 2.7.3
DI-20	A	Environmental code: Art L. 593-7, L. 593-30, R. 593-69, R. 593-75 MO of 7/2/2012: Art 1.3, 2.5.1, 2.5.6
DI-21	A	Environmental code: Art L. 593-30, R. 593-69, R. 593-75
DI-22	A	Public health code: Art L. 1333-1 MO of 7/2/2012: Art 1.1
DI-23	A	MO of 7/2/2012: Art 3.1 & 3.4
DI-24	A	Environmental code: Art L. 542-1 MO of 7/2/2012: Art 8.5.1
DI-25	A	Environmental code: Art L. 593-4, R. 593-16, R. 593-69, R. 593-75
DI-26	A	Environmental code: Art L. 542-1 MO of 7/2/2012: Art 8.5.1
DI-27	A	Basic Safety Rules: I.2 & III.2.f
DI-28	A	Environmental code: Art L. 542-1-1, L. 542-10-1 Basic Safety Rule III.2.f
DI-29	A	MO of 7/2/2012: Art 3.8 Basic Safety Rule III.2.f
DI-30	A	Environmental code: Art L. 593-4, R. 593-16, R. 593-69, R. 593-75
DI-31	A	Basic Safety Rule III.2.f
DI-32	A	Environmental code: Art L. 542-1, L. 542-10-1 MO of 7/2/2012: Art 3.1, 8.5.1 Basic Safety Rules I.2 & III.2.f
DI-33	A	Environmental code: Art L. 542-1, L. 542-10-1 MO of 7/2/2012: Art 3.1, 8.5.1 Basic Safety Rules I.2 & III.2.f

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-34	A	Environmental code: Art L. 542-1 MO of 7/2/2012: Art 8.5.1
DI-35	A	Basic Safety Rules I.2 & III.2.f
DI-36	A	Basic Safety Rules I.2 & III.2.f
DI-37	A	Basic Safety Rules I.2 & III.2.f
DI-38	A	MO of 7/2/2012: Art 3.4 Basic Safety Rules I.2, I.3.c, III.2.f
DI-39	A	MO of 7/2/2012: Art 2.5.1 Basic Safety Rules I.2 & III.2.f
DI-40	A	MO of 7/2/2012: Art 2.7.2 & 3.1 Basic Safety Rules I.2 & III.2.f
DI-41	A	MO of 7/2/2012: Art 2.3.1, 2.4.1, 2.6.1
DI-42	A	MO of 7/2/2012: Art 2.5.1 Basic Safety Rules I.2 & III.2.f
DI-43	A	Environmental code: Art L. 593-7 MO of 7/2/2012: Art 1.3 & 2.5.2
DI-44	A	Environmental code: Art L. 593-7 MO of 7/2/2012: Art 1.3 & 2.5.2
DI-45	A	MO of 7/2/2012: Art 3.1 & 3.4
DI-46	A	MO of 7/2/2012: Art 2.5.1 Basic Safety Rules I.2 & III.2.f
DI-47	A	Environmental code: Art L. 371-1, R. 122-5, R. 593-17
DI-48	A	Environmental code: Art R. 593-16, R. 593-17 Basic Safety Rules I.2 & III.2.f
DI-49	A	Environmental code: Art R. 593-16, R. 593-17 MO of 7/2/2012: Art 2.4.1 & 2.4.2 Basic Safety Rules I.2 & III.2.f
DI-50	A	Environmental code: Art R. 593-30 MO of 7/2/2012: Art 3.8 & 6.1 Resolution n°2015-DC-0532 of 17/11/2015: Art 3.2.2 to 3.2.4
DI-51	A	Environmental code: Art R. 593-16 & 593-30
DI-52	A	Environmental code: Art R. 593-16, R. 593-17 MO of 7/2/2012: Art 2.4.1 & 2.4.2 Basic Safety Rules I.2 & III.2.f
DI-53	A	Environmental code: Art R. 593-41 to 593-61 Resolution n°2017-DC-0616
DI-54	A	Environmental code: Art R. 593-30
DI-55	A	MO of 7/2/2012 : Art 2.6.1 & 2.6.3
DI-56	A	Environmental code: Art R. 593-16, R. 593-17 MO of 7/2/2012: Art 2.4.1 & 2.4.2 Basic Safety Rules I.2 & III.2.f
DI-57	A	Environmental code: Art R. 593-30
DI-58	A	Environmental code: Art R. 593-30
DI-59	A	Environmental code: Art R. 593-30
DI-60	A	Resolution n°2017-DC-0587 of 23/3/2017: Title III
DI-61	A	Resolution n°2017-DC-0587 of 23/3/2017: Title III

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-62	A	Environmental code: Art R. 593-30 MO of 7/2/2012: Art 7.1 Resolution n°2017-DC-0592 of 13/06/2017
DI-63	A	MO of 7/2/2012: Art 7.3 Resolution n°2017-DC-0592 of 13/06/2017
DI-64	A	MO of 7/2/2012: Art 7.6 Resolution n°2017-DC-0592 of 13/06/2017
DI-65	A	MO of 7/2/2012: Art 2.5.1
DI-66	A	MO of 7/2/2012: Art 2.4.1 & 2.5.1
DI-67	A	Environmental code: Art L. 593-18 MO of 7/2/2012: Art 2.7.2
DI-68	A	Environmental code: Art L. 593-31, R. 593-66, R. 593-67, R. 593-75
DI-69	A	Environmental code: Art L. 593-31, R. 593-66, R. 593-67, R. 593-75
DI-70	A	Environmental code: Art L. 593-31, R. 593-66, R. 593-67, R. 593-75
DI-71	A	Environmental code: Art R. 593-41 to 593-61 Resolution n°2017-DC-0616
DI-72	A	Environmental code: Art L. 593-30, L. 593-31, R. 593-61
DI-73	A	Environmental code: Art R. 593-73
DI-74	A	Resolution n°2017-DC-0587 of 23/3/2017: Art 4.2.1 & 4.2.2
DI-75	A	MO of 7/2/2012: Art 6.7 Resolution n°2017-DC-0587 of 23/3/2017: Art 3.1.1, 3.1.2, 3.3.1
DI-76	A	Resolution n°2017-DC-0587 of 23/3/2017: Art 3.1.1
DI-77	A	MO of 7/2/2012: Art 2.5.1 Basic Safety Rules I.2 & III.2.f
DI-78	A	Resolution n°2017-DC-0587 of 23/3/2017: Title III
DI-79	A	MO of 7/2/2012: Art 2.4.1 & 6.5 Resolution n°2017-DC-0587 of 23/3/2017: Art 3.4.1 & 3.4.2
DI-80	A	MO of 7/2/2012: Art 6.5
DI-81	A	Resolution n°2017-DC-0587 of 23/3/2017: Art 2.6, 3.3.1, 3.3.2
DI-82	A	Resolution n°2017-DC-0587 of 23/3/2017: Art 3.1.2 & 3.3.1
DI-83	A	Environmental code: Art L. 593-18, R. 593-30, R. 593-41 to 61 MO of 7/2/2012: Art 2.4.1 & 2.4.2
DI-84	A	Environmental code: Art R. 593-18 MO of 7/2/2012: Art 3.4 Resolution n°2015-DC-0532 of 17/11/2015: Art 4.3.4 & 4.3.5
DI-85	A	Environmental code: Art R. 593-30 MO of 7/2/2012: Art 3.1 Basic Safety Rules I.2 & III.2.f
DI-86	A	MO of 7/2/2012: Art 2.5.1 & 3.2 Basic Safety Rules I.2 & III.2.f
DI-87	A	Environmental code: Art R. 593-18 MO of 7/2/2012: Art 3.1 Resolution n°2015-DC-0532 of 17/11/2015
DI-88	B	Safety Guide n°1 on deep geological disposal facilities for radioactive waste Basic Safety Rules I.2 & III.2.f
DI-89	A	MO of 7/2/2012: Art 2.5.6
DI-90	A	MO of 7/2/2012: Art 3.8
DI-91	A	MO of 7/2/2012: Art 3.8

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-92	A	MO of 7/2/2012: Art 3.8
DI-93	A	Public health code: Art L. 1333-1 Environmental code: Art R. 593-16, R. 593-17, R. 593-18
DI-94	A	Environmental code: Art L. 593-7, R. 593-16
DI-95	A	MO of 7/2/2012: Art 3.2
DI-96	A	MO of 7/2/2012: Art 3.1
DI-97	A	Environmental code: Art L. 593-18, R. 593-30, R. 593-41 to 61 MO of 7/2/2012: Art 2.4.1 & 2.4.2
DI-98	A	Environmental code: Art L. 593-18, R. 593-30, R. 593-41 to 61 MO of 7/2/2012: Art 2.4.1 & 2.4.2
DI-99	A	Environmental code: Art R. 593-41 to 593-61 Resolution n°2017-DC-0616
DI-100	A	MO of 7/2/2012: Art 3.5, 3.6, 3.7
DI-101	A	MO of 7/2/2012: Art 3.2 Basic Safety Rules I.2 & III.2.f
DI-102	A	MO of 7/2/2012: Art 3.1 Basic Safety Rules I.2 & III.2.f
DI-103	A	MO of 7/2/2012: Art 3.1 Basic Safety Rules I.2 & III.2.f
DI-104	A	MO of 7/2/2012: Art 3.4
DI-105	A	MO of 7/2/2012: Art 3.8
DI-106	A	Environmental code: Art L. 593-18
DI-107	A	Environmental code: Art L. 593-18 Basic Safety Rule III.2.f
DI-108	A	Environmental code: Art L. 593-19

Germany

Benchmarking of implementation of the Disposal SRLs in the German framework as per 2017 was initiated at WENRA WGWD meeting 38 and concluded and agreed on during WGWD meeting 55, and the result is reflected in the table below.

The main instrument of the German regulatory disposal framework is the Atomic Energy Act (AtG /Ref 1/). This Act provides general provisions for protective and precautionary measures, radiation protection, the management of spent fuel and radioactive waste, licensing and supervisory provisions, management systems and regulations on administrative responsibilities and applies to all kinds of radioactive waste.

More detailed requirements regarding radiation protection of nuclear and thus also disposal facilities are included in 2011 Radiation Protection Ordinance (StrlSchV /Ref 4/). Regarding disposal these regulations are supplemented by 1983 Safety Criteria for the Final Disposal of Radioactive Wastes in a Mine (/Ref 20/), 2017 Site Selection Act (StandAG /Ref 5/) and, as per 2017, the Safety Requirements Governing the Final Disposal of Heat-Generating Radioactive Waste from 2010 (/Ref 2/). /Ref 2/ and /Ref 20/ have been adopted by the *Länderausschuss für Atomkernenergie* thus becoming enforceable on the licensee in regulatory procedures (mainly licensing and supervision). In addition, for deep geological disposal also mining regulations apply (e.g. /Ref 12/ and

/Ref 15/). Based on the regulatory framework described above the majority of SRL was benchmarked with an A-rating.

Where no specific technical standards exist for disposal, the regulatory authority may also use standards from other nuclear facilities such as nuclear power plants, as far as their content is applicable to disposal facilities. e.g., KTA standards (/Ref 3/, /Ref 13/, /Ref 21/) have been used in regulatory procedures for disposal. For the purposes of the Disposal benchmarking, the Konrad planning approval decision (*Planfeststellungsbeschluss* ; PfB; only available in German) and parts of the explanatory documents (EUs) approved during the planning approval procedure will be used as an example how technical standards became legally binding within the PfB. WGWD found that this approach meets the SRL but not on a formal level. As far as implementation of these standards for disposal is only achieved in licensing and supervision procedures the relevant SRL were benchmarked with a B-rating.

For the SRLs DI 18, DI 45, DI 80, DI 82 and DI 107, the C-ratings could not be resolved as the relevant SRL are not precisely reflected in German regulations or technical standards. However, no deficiency at all with respect to safety is existent in practice, as the relevant requirements are implemented through direct interaction between the regulatory body and operators, i.e. licensing and supervision. The licensee has to ensure the safety of the facility at any time by fulfilling the requirements of the license as well as of the nuclear technical regulations, which is checked within the regulatory supervision according to /Ref 1/ § 9h, § 19 (AtG) on both a regular (for Periodical Safety Review see /Ref1/§ 19a (3) and (4)) and an event-driven basis.

The German regulatory disposal framework has undergone many updates since 2017 and is still in further development, as the development and update of regulations is a dynamic process due to changes in the national and international framework or the advancing state of the art of science and technology.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	/Ref 1/ § 7c (1), /Ref 2/ Par. 9.1 and 9.2
DI-02	A	/Ref 1/ § 7c (2), /Ref 2/ Par. 9.2 and 9.3
DI-03	A	/Ref 1/ § 7c (2) no. 1, § 7 (2) no. 3, § 9b (3) and § 17 (1), § 19a (3) and (4) and § 24b, /Ref 2/ Par. 5.3, 9.2 and 8.8
DI-04	A	/Ref 1/ § 7 (2), /Ref 2/ Par. 9.1 and Par. 9.3
DI-05	A	/Ref 1/ §7 (2) no. 1 and 2, § 7 (2) no. 3 and § 7c (2) no. 2 and 3, /Ref 4/ § 31, /Ref 2/ Par. 9.1 and 9.5
DI-06	A	/Ref 1/ § 1 no. 2, § 9b (1), (3) and (5), § 7 (2) no. 3, § 7c (1), § 17 (1) and § 19 (1) and (3), /Ref 4/ § 48 (1) and (3), /Ref 18/ § 4.5, 5 and Appendix C, /Ref 12/ § 53 (1), § 55 (1) and (2), § 56,§ 69 (1) and (2) and § 71 (1), /Ref 20/ no. 5.1 and 10, /Ref 2/ Par. 7.4 and 9.7
DI-07	A	/Ref 1/ § 7c (1), (2) no. 1 and 2 and § 7 (2) no. 3, /Ref 2/ Par. 9.3 and 9.6
DI-08	B	/Ref 1/ § 7c (2) no. 1, § 7 (2) no. 3, /Ref 2/ Par. 9.1, 9.3 and 9.6, /Ref 13/ no. 3.4 (1) to (5), /Ref 21/ no. 4.3 (1)
DI-09	A	/Ref 1/ § 7c (2) no. 1 and 2 and § 7 (2) no. 1 and 3, /Ref 4/ § 12, § 31 (1) to (4), § 32, § 33 and § 34, /Ref 2/ Par. 9.1 and 9.4, /Ref 17/ Par. 2.1, /Ref 13/ no. 4.2.3

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-10	A	/Ref 1/ § 7 (2) and § 7c (2) no. 1, 2 and 3, /Ref 4/ § 30 (2) no. 1 and 2 and § 31 (1) no. 1 and (2), /Ref 22/, /Ref 2/ Par. 9.5 and Par. 9.6
DI-11	A	/Ref 1/ §7 (2), § 7 (2) no. 3 and § 7c (2) no. 1, 2 and 3, /Ref 2/ Par. 9.5 and Par. 9.6
DI-12	A	/Ref 1/ § 7 (2) and § 7c (2), /Ref 2/ Par. 9.5 and Par. 9.6
DI-13	A	/Ref 1/ § 7c (2) no. 1, 2 and 3 and § 7 (2) no. 3, /Ref 2/ Par. 9.6
DI-14	B	Ref 1/ § 7c (2) no. 1, 2 and 3 and § 7 (2) no. 3, /Ref 2/ Par. 9.2 to 9.7, /Ref 13/ no. 1 (1) to (4), no. 3.1, 3.2, 3.4 (1) and (2) and 3.5 (1) to (3)
DI-15	B	/Ref 1/ § 7c (2) no. 1 and (3) and § 9h, /Ref 4/ § 34 and § 49, /Ref 17/ § 2.1, /Ref 13/ no. 3.1, 3.2 and 5.1, /Ref 2/ Par. 7.1 and 8.1
DI-16	A	/Ref 1/ § 7c (2) no. 1, 2 and 3, § 7 (2) no. 3 and § 19a no. 3, /Ref 2/ Par. 9.1, 9.2, 9.3 and 9.7, /Ref 13/ no. 3.6
DI-17	B	/Ref 1/ § 7c (2) no. 1, /Ref 13/ no 3.4, 3.8, 4.2.3, 5.9 and 5.10
DI-18	C	/Ref 1/ § 7c (2) no. 1, 2 and 3, § 7 (2) no. 3 and § 9b (1) no. 1, /Ref 10/ § 3 (1) no. 6, /Ref 4/ § 34, /Ref 3/ no. 3.1 (1), /Ref 2/ Par. 7.1 and 5.1, /Ref 17/ Par. 2.1, /Ref 13/ no. 3.4
DI-19	B	/Ref 1/ § 7c (2) no. 1, 2 and 3, § 7 (2) no. 3, § 19a (3) and (4), /Ref 2/ Par. 5.1, 5.3, 9.2 and 9.3, /Ref 21/ § 2 and § 3
DI-20	A	/Ref 1/ § 7c (2) no. 1 and § 7 (2) no. 3, /Ref 2/ Par. 7.4, 10.1 and 10.2, /Ref 20/ Par. 10.2
DI-21	A	/Ref 1/ § 7 (2) no. 3, /Ref 5/ § 38, /Ref 2/ Par. 10.2, /Ref 20/ Par. 10.2
DI-22	A	/Ref 4/ § 6, /Ref 2/ Chapter 6 and Par. 7.4
DI-23	A	Ref 1/ § 7 (2) no. 3, /Ref 2/ Par. 8.7, /Ref 20/ no. 3.2
DI-24	A	/Ref 1/ § 9b (1), (1a) and (4) and § 7 (2) no. 3, /Ref 5/ § 26, /Ref 20/ Introduction, /Ref 2/ Par. 4.6 and Par. 9.1
DI-25	A	/Ref 1/ § 7c (2) no. 1, § 7 (2) no. 3 and § 19a (3) and (4), /Ref 4/ § 6, /Ref 2/ Chapter 5, Par. 5.1 to 5.3 and Par. 9.2
DI-26	A	/Ref 1/ § 9b (1) no. 1, (1a) and (4) and § 7 (2) no. 3, /Ref 5/ § 2 no. 9, §§ 22, 23, 24 (4), 27 (1) and (2), /Ref 2/ Par. 4.6 and Par. 5, /Ref 20/ no. 1 and 3.2.
DI-27	A	/Ref 1/ § 9b (1) no. 1, (1a) and (4) and § 7 (2) no. 3, /Ref 5/ §§ 1 (2), 2 no. 9, 22, 23, 24 (4), and 27 (1) and (2), /Ref 20/ no. 1 and 2, /Ref 2/ Par. 7.2 and Par. 7.2.1
DI-28	A	/Ref 1/ § 9b (1a) 1 and § 7 (2) no. 3, /Ref 5/ § 1 (4) and (5), § 2 no. 3 and 5, § 23 (5) no. 4 and § 26 (2) no. 3, /Ref 17/ Par. 1.2 no. 3, 2.2 and 2.4 no. 8, /Ref 2/ Par. 8.6
DI-29	A	/Ref 1/ § 7 (2) no. 3 and § 21b (1), /Ref 5/ §§ 12, 27, 28 (1) and (2) no. 6, /Ref 2/ Par. 7.2, 7.4 and 7.7, /Ref 20/ Par. 5.2 and 7.4
DI-30	A	/Ref 1/ § 7 (2) no. 3, /Ref 2/ Par. 8.4, 8.5 and 8.6, /Ref 17/ Chapter 2.1 and 2.4, /Ref 20/ Par. 7.1 to 7.4
DI-31	A	/Ref 1/ § 7 (2) no. 3, /Ref 8/ § 2 (2) no. 3, /Ref 8/ § 6 (1), /Ref 9/ Article 2 A (1), /Ref 17/ Par. 2.1
DI-32	A	/Ref 2/ Par. 5.1, 7.2, 7.2.1 and 7.7
DI-33	A	/Ref 1/ § 7 (2) no. 3, /Ref 11/ § 16 (1) no. 2 and § 40 (2) no.3, /Ref 5/ § 27 (1) and (2), , /Ref 2/ Par. 7.2 and 7.2.1, /Ref 20/ no. 5 and 6
DI-34	A	/Ref 5/ §26 (1) and 27 (1) to (3), /Ref 2/ Par. 5, 8.1 and 8.7, /Ref 20/ no. 5 and 8
DI-35	A	/Ref 1/ § 7 (2) no. 3, /Ref 4/ § 49 (1) and (2), /Ref 2/ Par. 8.1, /Ref 20/ no. 5.2
DI-36	A	/Ref 1/ § 7 (2) no. 3, /Ref 2/ chapter 6, Par. 6.1 to 6.5 and 7.2, /Ref 20/ no. 5.2

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-37	A	/Ref 1/ § 7 (2) no. 3, /Ref 4/ § 49 (1) and (2), /Ref 2/ Par. 8.1 to 8.5 and 8.7, /Ref 20/ § 5
DI-38	A	/Ref 1/ § 7 (2) no. 3, /Ref 5/ Appendix 8, /Ref 4/ §§ 46, 47 and 49, /Ref 2/ Par. 4.2, 4.3, 4.1, 4.6, 8.7 and 7.2.4, /Ref 20/ no. 2, 5 and 8
DI-39	B	/Ref 1/ § 7 (2) no. 3, /Ref 2/ Par. 7.1 and 7.2.3, /Ref 21/ no. 5.1 (2) a, /Ref 17/ no. 2.1
DI-40	A	/Ref 12/ § 55 (1) no. 3, /Ref 2/ Par. 7.2.3, /Ref 1/ § 7(2) no. 3, § 19a (3) and (4), /Ref 4/ Par. 49 (1) and (2)
DI-41	A	/Ref 1/ § 7 (2) and 9b, /Ref 2/ Par. 5.1 and 5.2
DI-42	A	/Ref 5/ §§27 (2) and (4) and 24 (5) Appendix 10, /Ref 20/ no. 3.2,8 and 4.4, /Ref 2/ Par. 7.1 and 8.7
DI-43	B	/Ref 1/ § 7 (2) no. 3, /Ref 2/ Par. 7.1 and 5.3, /Ref 13/ Par. 5.2.1, /Ref 17/ no. 2.1
DI-44	A	/Ref 1/ § 7 (2) no. 3, /Ref 4/ § 48 (1), /Ref 2/ Par. 7.4, /Ref 20/ no. 7.4 and 10.1, /Ref 18/,
DI-45	C	/Ref 1/ § 7 (2), /Ref 4/ § 43 (1), /Ref 5/ §§ 22, 23, 26 (2), /Ref 2/ Par. 7.2.4 and 8.4 to 8.6, /Ref 20/ no. 7.1 and 7.2
DI-46	A	/Ref 1/ §§ 7 (2) no. 3 and 7c (3), /Ref 4/ §§ 36, 39, 43 (1) and 49, /Ref 2/ Par. 8.1 and 7.1, /Ref 17/ Chapter 1.3, 2.1 and 2.4
DI-47	A	/Ref 10/ § 3 (1), /Ref 11/ § 6 (3) and § 14g
DI-48	A	/Ref 2/ Par. 7.4, /Ref 14/ § 52a, /Ref 18/ Appendix C.2
DI-49	A	/Ref 1/ § 7 (2) no.3, /Ref 14/ § 52a, /Ref 4/ § 48, /Ref 2/ Par. 7.4 and 10.1, /Ref 18/ no. 1. and Appendix C.2, /Ref 20/ no. 5.1, 7.4 and 10.1
DI-50	A	/Ref 1/ § 9b, /Ref 2/ Par. 5.3, 7.2.3 and 8.1
DI-51	A	/Ref 1/ § 7 (2) no. 3, /Ref 2/ Par. 7.2.1, 7.2.3, 8.2 and 8.3, /Ref 20/ no. 7.1 and 7.2, /EU 390/
DI-52	A	/Ref 11/ § 16 (1), /Ref 1/ § 7 (2) no. 3, /Ref 12/ § 63 (1) 1, (2) and (3) 1 and § 64 (1), /Ref 15/ § 15 (4), Ref 2 /§ 7.4, /Ref 20/ no. 5.1, 7.4 and 10.1
DI-53	A	/Ref 1/ § 9b (1) and § 7 (2) no. 3, /Ref 13/ no. 5.3
DI-54	A	/Ref 1/ § 9b (1), § 7c (1), § 19 (1), § 19 (3), /Ref 2/ Par. 5.3 and 8.1
DI-55	A	/Ref 1/ § 7 (2) no. 3, § 7c (3) and § 19a (3) and (4), /Ref 4/ § 34 no. 6 and, /Ref 2/ Par. 8.1 and 8.6
DI-56	A	/Ref 1/ § 7 (2) no.3 , /Ref 4/ § 48, /Ref 2/ Par. 5.3, 7.2 and 7.4, /Ref 18/ no. 4 and 5, /Ref 20/ no.7.4
DI-57	A	/Ref 1/ § 7 (2) no. 3 and § 7c, /Ref 3/, /Ref 2/ Par. 5.3, 8.1 and 8.3, /Ref 20/ no. 7 and, /Ref 17/ no. 2.1
DI-58	B	/Ref 1/ § 7c (1) and § 7 (2) no.3, /Ref 3/ Par. 6.5.6, /Ref 21/ § 8 (1) to (5), /Ref 2/ Par. 7.5, 7.6, 9.2 and no. 9.3
DI-59	A	/Ref 1/ § 7 (2) No. 3, /Ref 2/ Par. 8.8 and 7.4,/Ref 20/ no. 9
DI-60	A	/Ref 1/ § 7 (2) no. 3, § 9b (1), § 19a (3) and (4),/Ref 2/ chapter 5 and Par. 5.1 and 5.3, / Ref 13/ no. 5.3
DI-61	A	/Ref 1/ § 9b(1), § 7 (2) No. 3, /Ref 2/ chapter 5 and Par. 5.1 and 5.3, Ref 13/ no. 5.3
DI-62	A	/Ref 1/ § 7c (3)and Par. 19a (4), /Ref 4/ § 34, /Ref 2/ Par. 8.1 and 8.6
DI-63	A	/Ref 1/ § 7 (2) no. 3, § 7c (1) (2) and (3), /Ref 4/ §§ 34 and 53
DI-64	A	/Ref 1/ § 7 (2) no. 3, § 7c (3), § 19 (1), /Ref 10/ § 3 (1) no.6, /Ref 4/ § 53 (1), (2) and (3), /Ref 13/ Par. 5.8, /Ref 15/ § 2 (1), /Ref 17/ Par 2.1
DI-65	B	/Ref 1/ § 7 (2) no. 3, § 19a, /Ref 10/ § 3 (1) no. 6; /Ref 3/ no. 3, no.6.4., no.7.3; /Ref 13/ 5.2, 5.16, /Ref 17/no.2.1

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-66	A	/Ref 1/ § 7 (2) no. 3; § 19a; /Ref 3/ no. 6.4.3, /Ref 13/ 5.16, /Ref 2/ Par. 5.3 and 10.1
DI-67	B	/Ref 1/ § 7 (2) no. 3, § 19a; /Ref 13/ no. 5.16, /Ref 2/ Par. 5.3
DI-68	A	/Ref 1/ § 9b (1), (1a), § 7 (2) no. 3, /Ref 2/ Par. 7.2.3 and 8.7, /Ref 20/ no. 9
DI-69	A	/Ref 1/ § 7 (2) no.3, § 9b (1), § 9b (1a), /Ref 10/ § 3 (1) no. 1 a), b), no. 2 and 3 ; /Ref 12/ §§ 53 and 55 ; /Ref 2/ Chapter 2, /Ref 2/ Par. 5.1, 7.4, 8.8, /Ref 8/ Par. 6, /Ref 9/ Article 2A, /Ref 2/ Chap. 10, /Ref 20/ no. 9, no.10 ; Ref 18/ no. 2.4, no.4.5. Appendix C, /Ref 12/ § 53 (1), § 55 (1) and (2)
DI-70	A	/Ref 1/ § 7 (2) no. 3, § 9b (1); § 19 (1), /Ref 2/ Par. 7.4, 8.1 and 8.7
DI-71	A	/Ref 1/ §§ 7 (2) no. 3, 9(1), 9b (1) and 9b (1a)
DI-72	A	/Ref 1/ § 7 (2) no. 3, /Ref 4/ § 48, /Ref 2/ Par. 7.4 and 9.7, /Ref 20/ no. 10.1; /Ref 18/ no. 4, no. 5, Appendix C no.2.1.3.
DI-73	A	/Ref 1/ § 1 no.2, § 9b (1), (3) and (5), § 7 (2) no.3, § 7c (1), §17 (1) and § 19 (1) and (3) /Ref 4/ § 48 (1) and (3); /Ref 18/ § 4.5; § 5 /Ref 12/ § 53 (1), § 55 (1) and (2), § 56 and § 69 (1) and (2); /Ref 20/ no.10, /Ref 2/ Par. 7.4 and 9.7
DI-74	A	/ Ref 5/ § 27 (3), /Ref 4/ Par. 74, /Ref 2/ Par. 5.1 and 7.5, /Ref 20/ no. 8
DI-75	A	Ref 1/ § 7 (2) no. 3; /Ref 4/ § 74; /Ref 20/ no. 8, /Ref 2/ Par. 7.5
DI-76	A	/Ref 1/ § 7 (2) no. 3, /Ref 4/ Par. 74 and § 73 (1), /Ref 20/ no. 8
DI-77	A	/Ref 1/ § 7 (2) no. 3; /Ref 4/ §74, /Ref 2/ Par. 8.6, /Ref 20/ no. 8
DI-78	A	/Ref 1/ § 9b (1), § 7 (2) no. 3 and § 19; /Ref 4/ § 74
DI-79	A	/Ref 4/ Par. 74, § 75 (3), 76 (3) and Appendix X, /Ref 2/ Par. 7.6
DI-80	C	/Ref 1/ § 7 (2) no. 3, /Ref 17/ Chapter 2.1
DI-81	B	/Ref 1/ § 7 (2) no. 3; /Ref 4/ § 74 (1) to (3), Appendix X /Ref 2/ Par. 7.6
DI-82	C	/Ref 4/ Par. 74, 75 (1), (3) and 76 (3)
DI-83	A	/Ref 1/ §§ 7 (2) no. 3, 9b (4), 19a no. 3 and 4; /Ref 5/ §3 14 (1), 15 (1), 16 (1), 17 (1), 18 (1), 19 (1), /Ref 2/ Chapter 2, /Ref 2/ Par. 5.3, Par. 7.1 and Par. 7.2, /Ref 10/ § 3 (1) no. 1, 2 and 6
DI-84	A	/Ref 1/ §§ 1, 7 (2) no. 3 and 19a no. 3 and 4; /Ref 4/ §§ 1, 36 to 49; /Ref 20/ no. 3 and no. 7 and /Ref 2/ Chapter 4 Safety Principles and Par. 7.1
DI-85	A	/Ref 1/ § 7 (2) no. 3, § 19a (3), (4) ; /Ref 10/ § 3 (1) no. 1 c), no. 6; /Ref 5/ §§ 13 (2), 14 (1), 16 (1), 18 (1), /Ref 2/ Par. 7.1, Par. 7.2, Par. 7.2.3, /Ref 20/ no. 2, no. 3.3, no. 5, no. 7,
DI-86	A	/Ref 1/ § 7 (2) no. 3, § 19a (3), (4); /Ref 10/ § 3 (1) no. 1 c); /Ref 5/ § 24 (3), /Ref 2/ Par. 7.1, Par. 7.2.3, Par. 7.2.2 and Par. 7.3
DI-87	A	/Ref 1/ § 7 (2) no. 3; /Ref 10/ § 3 (1) no. 1 c); /Ref 2/ no. 7.2; /Ref 20/ no. 1
DI-88	A	/Ref 1/ § 7 (2) no. 3, /Ref 2/ Par. 5.2
DI-89	A	/Ref 1/ § 7 (2) no. 3, /Ref 2/ Par. 7.2 and Par. 10.1
DI-90	A	/Ref 1/ § 7 (2) no. 3, /Ref 2/ Par. 7.2, Par.7.2.2, Par. 7.7, Par. 9.4 and 10.1
DI-91	A	/Ref 1/ § 7 (2) no. 3; /Ref 10/ § 3 (1) no. 1 a), b), c), no. 6, /Ref 2/ Par. 7.2
DI-92	A	/Ref 1/ § 7 (2) no. 3; /Ref 2/ Chapter 2, Par. 7.2 and Par. 7.3
DI-93	A	/Ref 1/ § 7 (2) no. 3; /Ref 4/ § 6, /Ref 2/ Chapter 5 and /Ref 2/ Par. 5.1, Par. 5.2 and Par. 5.3
DI-94	A	/Ref 1/ § 7 (2) no. 3; § 9b (1), /Ref 10/ § 3 (1) no. 1 a), b); /Ref 20/ no. 9 and 10, /Ref 2/ Par. 7.4, Par. 5.3 and Par. 8.8
DI-95	A	/Ref 1/ § 7c (2) no. 1, § 7 (2) no. 3, /Ref 2/ Par. 9.2 and Par. 9.3
DI-96	A	/Ref 2/ Chapter 1, Chapter 2, Chapter 5 and Chapter 7.2, /Ref 5/ §§ 26, 23; /Ref 1/ § 7 (2) 3 and § 9b (1) ; /Ref 20/ no. 10

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-97	A	/Ref 1/ § 7 (2) no. 3, § 9b (1), § 19a (3), (4); /Ref 2/ Chapter 2, Par. 7.2 and Par. 5.3
DI-98	A	/Ref 1/ § 7 (2) no. 3, § 19a (3), (4), § 9b (1), /Ref 2/ Chapter 2, Chapter 5, Par. 5.3 and Par. 7.2
DI-99	B	/Ref 1/ § 7 (2) no. 3; § 9b (1), § 19a (3), (4); /Ref 13/ no. 5.3, in particular (1), (3) and (5), /Ref 2/ Par. 5.3 and 7.2
DI-100	A	/Ref 1/ § 7 (2) no. 3; /Ref 4/ § 49; /Ref 20/ no. 5.2, /Ref 2/ Par. 7.1 and 8.1
DI-101	A	/Ref 1/ § 7 (2) no. 3; /Ref 20/no. 5.2, /Ref 2/ Par. 6.2, 6.3, 6.4, 6.5 and 7.2
DI-102	A	/Ref 1/ § 7 (2) no. 3; /Ref 10/ § 3 (1) no. 1b, /Ref 2/ Par. 5.1, 7.2.3, 8.1 and 8.7
DI-103	A	/Ref 5/ Chapter 1 §1, /Ref 2/ Par. 7.2 and Par. 7.2.1
DI-104	A	/Ref 1/ § 7 (2) no. 3; /Ref 2/ Par. 7.2 and 7.2.4
DI-105	A	/Ref 1/ § 7 (2) no. 3; /Ref 20/no. 5.2, /Ref 2/ Par. 7.2
DI-106	A	/Ref 1/ § 7 (2) no. 3, § 19a (3), (4), /Ref 2/ Par. 5.3 and Par. 8.8
DI-107	C	/Ref 1/ § 19a (3), (4) ; /Ref 4/ § 74, /Ref 2/ Par. 5.3
DI-108	B	/Ref 1/ § 19a (3); § 9b (3); § 17. § 19; /Ref 13 / no. 5.16 (4), (5), /Ref 2/ Par. 5.3 and 10.1

References

/Ref 1/	Act on the Peaceful Utilisation of Atomic Energy and the Protection against its Hazards (Atomic Energy Act - AtG) as of 22.07.2017 Legislative amendments as of 28 July 2025: - Article 16 Act on the Implementation of the NIS-2 Directive and on the Regulation of Essential Principles of Information Security Management in the Federal Administration as of 2. Dezember 2025 (BGBl. 2025 I Nr. 301) - Article 1 19th Act amending the Atomic Energy Act (19. AtGÄndG) as of 4 December 2022 (BGBl. I S. 2153) The Nuclear Safety Officer and Reporting Ordinance (Atomrechtliche Sicherheitsbeauftragten- und Meldeverordnung - AtSMV) - as of 14 Ocotober 1992 (BGBl. I S. 1766) - last amended by Article 18 of the Regulation as of 29 November 2018 (BGBl. I S. 2034; 2021 I 5261)
/Ref 2/	Safety Requirements Governing the Final Disposal of Heat-Generating Radioactive Waste, As at 30 September 2010 Legislative amendments as of 28 July 2025: - Disposal Safety Requirements Ordinance (EndlSiAnfV) as of 6 October 2020 (BGBl. I. S. 2094) - Disposal Safety Analysis Ordinance (EndlSiUntV) as of 6 October 2020 (BGBl. I. S. 2094, 2103) with calculation basis for dose estimation
/Ref 3/	KTA 1201 (2009-11), Safety Standards of the Nuclear Safety Standards Commission (KTA), Requirements for the Operating Manual as of 11.2015, BAnz. 29.4.2016 B2
/Ref 4/	Radiation Protection Ordinance – (StrlSchV) as of 04.10.2011 Legislative amendments as of 28 July 2025: - Article 10 of Medical Research Act as of 23 October 2024 (BGBl. 2024 I No. 324) - Radiation Protection Act (StrlSchG) as of 23 October 2024 (BGBl. 2024 I No. 324) - Nuclear Waste Management Ordinance (AtEV) as of 21 December 2021 (BGBl. I S. 5261) with regulation of waste acceptance criteria (WAC)

/Ref 5/	- *Site Selection Act* (StandAG), as of 20.07.2017) Legislative amendments as of 28 July 2025: Article 8 of Act Amending the Federal Regional Planning Act and Other Provisions (ROGÄndG) as of 22 March 2023 (BGBl. 2023 I No. 88)
/Ref 8/	*Act implementing the Convention of 5 April 1973 between the Non Nuclear Weapon States of the European Atomic Energy Community, the European Atomic Energy Community and the International Atomic Energy Agency in implementation of Article III para. 1 and 4 of the Treaty from 1 July 1968 on the non-Proliferation of Nuclear Weapons (verification Agreement) and to the additional Protocol to the Convention of 22 September 1998*, BGBl. I S. 74; 2004 II S. 789
/Ref 9/	*Law to the resolution of 8 July 2005 amending the Convention of 26 October 1979 on the Physical Protection of Nuclear Material*, as of 6 June 2008, BGBl. II, 2008, Nr. 14, S. 574
/Ref 10/	*Nuclear Licensing Procedure Ordinance* (AtVfV) as of 29.05.2017 Legislative amendments as of 28 July 2025: Article 16 of Ordinance to Reduce Bureaucratic Burdens on Citizens, the Economy, and the Administration as of 11 December 2024 (BGBl. 2024 I No. 411)
/Ref 11/	- *Environmental Impact Assessment Act (UVPG*) as of 08.09.2017, BGBl. I S. 3370 Legislative amendments as of 28 July 2025: Article 10 Fourth Act on the Reduction of Bureaucratic Burdens as of 23 October 2024 (BGBl. 2024 I No. 323)
/Ref 12/	*German Federal Mining Act (BBergG*) as of 7 august 2013 Legislative amendments as of 28 July 2025: Article 39 Fourth Act on the Reduction of Bureaucratic Burdens as of 23 October 2024 (BGBl. 2024 I No. 323)
/Ref 13/	KTA 1402 (2012-11), Safety Standards of the Nuclear Safety Standards Commission (KTA), Integrated Management System for the Safe Operation of Nuclear Power Plants, BAnz. of 17.5.2018 B8
/Ref 14/	(*Federal Pollution Control Act (*BImSchG) *as of 30 November 2016*) Legislative amendments as of 28 July 2025: Article 1 Act Implementing the Requirements of Directive (EU) 2023/2413 for Approval Procedures under the Federal Immission Control Act and the Water Resources Act, as well as for Planning Procedures under the Building Code and the Regional Planning Act, Amending the Federal Waterways Act and the Wind Energy Area Requirement Act as of 12 August 2025 (BGBl. 2025 I No. 189)
/Ref 15/	*General Federal Mining Ordinance (ABBergV*) as of 23 October 1995 (BGBl. I S. 1466), last amended by Article 5 Act on the Reorganization of Circular Economy and Waste Law (BGBl. I S. 212) Legislative amendments as of 28 July 2025: Article 4 Ordinance Amending the Health Protection Mining Ordinance and Other Mining and Occupational Safety Ordinances as of 18 October 2017 (BGBl. I S. 3584)
/Ref 17/	Empfehlung der Entsorgungskommission ESK - *Guideline on the safe operation of a disposal facility for in particular heat-generating radioactive waste of 10.12.2015*) Legislative amendments as of 28 July 2025: 10 May 2023
/Ref 18/	*Directive on emission and immission monitoring of nuclear facilities as of 2005 (REI) GMBl. 2006, No. 14 to 17* Legislative amendments as of 28 July 2025: 1 October 2023
/Ref 20/	Safety Criteria for the Final Disposal of Radioactive Wastes in a Mine as of 20 April 1983, (GMBl. 1983, Nr. 13, S. 220) - RdSchr. d. BMI v. 20.4.1983 - RS - AGK 3 - 515 790/2

/Ref 21/	Sicherheitstechnische Regel des KTA (KTA 1401) General Requirements for the Quality Assurance as of 11.2017, BAnz. vom 17.5.2018 B8
/Ref 22/	Technical Qualification Guideline Pursuant to the Radiation Protection Ordinance as of 19. April 2006, GMBl. 2004, No. 40/41, p. 799, amended on 19 April 2006 (GMBl. 2006, No. 38, p. 735.)

Hungary

Hungary conducted the self-assessment against the Radioactive Waste Disposal Facilities Safety Reference Levels (SRLs), based on the Government Decree 155/2014 (VI. 30.)[5]. This assessment was benchmarked by members of the WGWD between WGWD-36 and WGWD-42 (2016–2019). Of the 108 SRLs included in the Disposal Report, all were assigned an "A" rating, indicating full compliance, and were officially accepted by the WGWD. Overall, the Hungarian regulatory framework was found to be fully compliant with the requirements mandeted by the Disposal Report. After the WGWD-42, Hungary has no further actions related to compliance with the Disposal Report requirements.

# SRL	Current status	Referenced legislation or regulation
DI-01	A	Decree 155/2014, 8.§(1), 98.§(1), (2), (3), 6.§(7)
DI-02	A	Annex 2, sections 2.3.8.0100, 2.3.9.1500
DI-03	A	Decree 155/2014, 5.§(4), Annex 2 section 2.3.20.0100
DI-04	A	Decree 155/2014, 5.§(1), Annex 1 section 1.2.1.0300
DI-05	A	Decree 155/2014, 6.§(7), 14.§, 15.§
DI-06	A	Decree 155/2014, 8.§(1)
DI-07	A	Decree 155/2014, 8.§(3), 13.§
DI-08	A	Decree 155/2014, 8.§(4), 11.§(2), Annex 2 section 2.3.20.0600
DI-09	A	Decree 155/2014, Annex 2 section 2.3.3.0200
DI-10	A	Decree 155/2014, 6.§(7)
DI-11	A	Decree 155/2014, 15.§(1), Annex 1 section 1.4.2.0100, 1.4.2.0200
DI-12	A	Decree 155/2014, 15.§(2), (3) Annex 1 section 1.4.2.0200
DI-13	A	Decree 155/2014, 11.§(1), (2) Annex 1 section 1.5.3.1300
DI-14	A	Decree 155/2014, Annex 1 sections 1.2.1.0100, 1.5.2.0400
DI-15	A	Decree 155/2014, 62.§, Annex 1 sections 1.2.1.0300, Annex 2 sections 2.2.1.0500, 2.2.1.0600, 2.2.1.0700, Decree 167/2010, Section 12.§
DI-16	A	Decree 155/2014, 6.§(1), (7), Annex 1 section 1.6.4.0100

[5] *As a result of the change in its legal status, the HAEA has been an independent regulatory body since January 1, 2022 and it has been empowered to issue regulations in the scope of its tasks defined by the Act on Atomic Energy based on the authorization of the Fundamental Law of Hungary. In this context the previous Govt. Decree (Govt. Decree 155/2014. (VI. 30.)) was replaced by the HAEA Presidential Decree in 2022, but the requirements have not changed in the meantime. The official name of the effective legislation is the following: HAEA Decree 9/2022 (XII. 29.) on the safety requirements for facilities ensuring interim storage or final disposal of radioactive wastes and the corresponding authority activities.*

# SRL	Current status	Referenced legislation or regulation
DI-17	A	Decree 155/2014, 6.§(7), Annex 1 sections 1.2.4.0100, 1.5.2.0500, Annex 2 sections 2.2.8.0600, 2.3.20.0100, 2.3.9.0900
DI-18	A	Decree 155/2014, Annex 1 sections 1.5.2.0400, Annex 2 sections 2.3.1.0100
DI-19	A	Decree 155/2014, Annex 2 sections 2.3.20.0100, 2.3.20.0500
DI-20	A	Decree 155/2014, 6.§(6), (7), 20.§ (1), (4), 57.§(1), (3), Annex 2 sections 2.3.21.0400, 2.3.20.0100, 2.3.6.0500, 2.3.9.0900, 2.3.21.0100
DI-21	A	Decree 155/2014, 65.§, 71.§,72.§, Annex 2 sections 2.3.21.0300
DI-22	A	Decree 155/2014, 4.§ (1), (2), (5) Annex 2 sections 2.2.4.0100, 2.2.1.0300
DI-23	A	Decree 155/2014, Annex 2 sections 2.2.1.1200, 2.2.1.1300
DI-24	A	Decree 155/2014, Annex 2 sections 2.2.1.1400
DI-25	A	Decree 155/2014, Annex 2 sections 2.2.1.0800, 2.2.1.1500
DI-26	A	Decree 155/2014, Annex 2 sections 2.2.1.1200, 2.2.1.1300
DI-27	A	Decree 155/2014, Annex 2 sections 2.2.1.1300
DI-28	A	Decree 155/2014, Annex 2 sections 2.2.1.1600
DI-29	A	Decree 155/2014, Annex 2 sections 2.2.1.1700
DI-30	A	Decree 155/2014, Annex 2 sections 2.2.1.1800
DI-31	A	Decree 155/2014, Annex 2 sections 2.2.1.1900
DI-32	A	Decree 155/2014, 40.§(1)
DI-33	A	Decree 155/2014, 40.§(2)
DI-34	A	Decree 155/2014, Annex 2 section 2.2.1.0800
DI-35	A	Decree 155/2014, 57.§, 58.§
DI-36	A	Decree 155/2014, Annex 2 section 2.2.2.0900
DI-37	A	Decree 155/2014, Annex 2 section 2.2.2.0900
DI-38	A	Decree 155/2014, 4.§ (1), (2) Annex 2 sections 2.2.1.0400, 2.2.1.0800, 2.2.8.1600, 2.2.8.1700
DI-39	A	Decree 155/2014, Annex 2 sections 2.2.1.1400
DI-40	A	Decree 155/2014, Annex 2 sections 2.2.2.0100, 2.2.2.300, 2.2.2.0800
DI-41	A	Decree 155/2014, Annex 1 sections 1.2.1.0300, 1.3.5.0100, 1.3.5.0200, Annex 2 sections 2.2.8.0600, 2.3.20.0100, 2.3.9.0900
DI-42	A	Decree 155/2014, Annex 2 section 2.2.2.1000
DI-43	A	Decree 155/2014, Annex 2 section 2.2.2.1000
DI-44	A	Decree 155/2014, Annex 2 section 2.2.7.1300
DI-45	A	Decree 155/2014, Annex 2 section 2.2.1.1400
DI-46	A	Decree 155/2014, Annex 2 sections 2.2.1.0100, 2.2.7.1500, 2.2.5.0100, 2.2.6.0500,
DI-47	A	Decree 155/2014, 57.§(1), Annex 2 section 2.2.7.1200
DI-48	A	Decree 155/2014, 57.§(2), Annex 2 section 2.2.7.1300
DI-49	A	Decree 155/2014, 57.§(3)
DI-50	A	Decree 155/2014, 56.§
DI-51	A	Decree 155/2014, 56.§
DI-52	A	Decree 155/2014, 58.§, Annex 2 section 2.2.1.1700
DI-53	A	Decree 155/2014, 59.§
DI-54	A	Decree 155/2014, 63.§(1)
DI-55	A	Decree 155/2014, Annex 2 sections 2.2.1.0700, 2.2.7.0500,

# SRL	Current status	Referenced legislation or regulation
DI-56	A	Decree 155/2014, 57.§(3), Annex 2 sections 2.3.20.0100, 2.3.20.0400, 2.2.1.1700
DI-57	A	Decree 155/2014, Annex 2 section 2.2.1.0500
DI-58	A	Decree 155/2014, 61.§(1), Annex 2 sections 2.2.2.0200, 2.3.2.0200, 2.2.4.0100
DI-59	A	Decree 155/2014, 65.§, Annex 2 sections 2.2.8.2600
DI-60	A	Decree 155/2014, 91.§(2), Annex 2 sections 2.3.14.0600
DI-61	A	Decree 155/2014, Annex 2 sections 2.3.13.0100, 2.3.13.0200, 2.3.13.0300, 2.3.13.0600, 2.3.1.0400
DI-62	A	Decree 155/2014, 112.§(1), 113.§, Annex 2 sections 2.2.1.0100, 2.2.1.0600, 2.2.9.0100, 2.2.9.0210, 2.3.4.2000, 2.3.7.0800, 2.3.17.0500, 2.3.18.0100,
DI-63	A	Decree 155/2014, Annex 2 sections 2.3.3.0200, 2.3.3.0300, 2.3.17.0100, 2.3.17.0200, 2.3.17.0300
DI-64	A	Decree 155/2014, 112.§(1), (2), Annex 2 sections 2.3.17.0300, 2.3.17.1100, Decree 167/2010, Section 11.§(2), Annex 1
DI-65	A	Decree 155/2014, Annex 2 sections 2.3.8.0100, 2.3.9.0100, 2.3.9.0200
DI-66	A	Decree 155/2014, Annex 2 sections 2.3.9.0700, 2.3.9.1800
DI-67	A	Decree 155/2014, Annex 2 sections 2.3.9.1000, 2.3.9.1900
DI-68	A	Decree 155/2014, 65.§, 67.§(1)
DI-69	A	Decree 155/2014, 65.§, 66.§, Annex 2 sections 2.2.7.1300, 2.2.7.1400, 2.3.21.0400, 2.4.1.0200
DI-70	A	Decree 155/2014, 67.§(1)
DI-71	A	Decree 155/2014, 89.§, Annex 2 sections 2.3.14.0100, 2.4.1.0300
DI-72	A	Decree 155/2014, 69.§ (1), Annex 2 section 2.4.1.0200
DI-73	A	Decree 155/2014, 71.§, Annex 2 sections 2.4.2.0100, 2.4.2.0300
DI-74	A	Decree 155/2014, Annex 2 section 2.2.3.0100
DI-75	A	Decree 155/2014, 67.§(1), 98.§(1), Annex 2 section 2.2.3.0200
DI-76	A	Decree 155/2014, 16.§(4)
DI-77	A	Decree 155/2014, 16.§(4), Annex 2 sections 2.2.3.0200, 2.2.3.0400
DI-78	A	Decree 155/2014, 16.§(5), 21.§(2), 89.§(1)
DI-79	A	Decree 155/2014, 17.§(1), (2), (3)
DI-80	A	Decree 155/2014, 20.§(1)
DI-81	A	Decree 155/2014, 11.§(2), 17.§(1), (2),
DI-82	A	Decree 155/2014, 18.§
DI-83	A	Decree 155/2014, 98.§(1), (2), 99.§(1)
DI-84	A	Decree 155/2014, Annex 2 sections 2.2.8.0300, 2.2.8.1200
DI-85	A	Decree 155/2014, 98.§(3) Annex 2 section 2.2.8.0100
DI-86	A	Decree 155/2014, 98.§(1), (3) Annex 2 sections 2.2.8.0100, 2.2.8.0200
DI-87	A	Decree 155/2014, Annex 2 section 2.2.8.2200
DI-88	A	Decree 155/2014, 4.§ (4), Annex 2 sections 2.2.1.1900, 2.2.8.0400, 2.2.8.0800
DI-89	A	Decree 155/2014, Annex 2 section 2.2.8.2300
DI-90	A	Decree 155/2014, Annex 2 section 2.2.8.2400
DI-91	A	Decree 155/2014, Annex 2 section 2.2.8.2400
DI-92	A	Decree 155/2014, Annex 2 section 2.2.8.2400

# SRL	Current status	Referenced legislation or regulation
DI-93	A	Decree 155/2014, Annex 2 section 2.2.8.2500
DI-94	A	Decree 155/2014, Annex 2 section 2.2.8.2600
DI-95	A	Decree 155/2014, Annex 2 section 2.2.8.2700
DI-96	A	Decree 155/2014, Annex 2 section 2.2.8.2800
DI-97	A	Decree 155/2014, 5.§ (5), 98.§(2), 99.§(1), (4), Annex 2 sections 2.3.2.0700, 2.3.2.0800
DI-98	A	Decree 155/2014, 99.§(1)
DI-99	A	Decree 155/2014, 99.§(3)
DI-100	A	Decree 155/2014, 4.§ (3), (5), Annex 2 sections 2.2.8.0300, 2.2.8.0500
DI-101	A	Decree 155/2014, Annex 2 section 2.2.8.0400
DI-102	A	Decree 155/2014, Annex 2 section 2.2.8.1200
DI-103	A	Decree 155/2014, Annex 2 section 2.2.8.1300
DI-104	A	Decree 155/2014, Annex 2 section 2.2.8.1700
DI-105	A	Decree 155/2014, Annex 2 section 2.2.8.1800
DI-106	A	Decree 155/2014, 102.§ (1), 103.§(1)
DI-107	A	Decree 155/2014, 103.§(3)
DI-108	A	Decree 155/2014, 104.§(1), (2)

References

Decree 155/2014	Govt. Decree 155/2014. (VI. 30.) Korm. on the safety requirements of interim storage and final disposal facilities of radioactive waste and the related regulatory activities.
Annex 1	Annex 1 to Govt. Decree 155/2014. (VI. 30.) Korm. Safety Code Volume 1. Management systems of repositories
Annex 2	Annex 2 to Govt. decree 155/2014. (VI. 30.) Korm. Safety Code Volume 2. Design, construction, operation, closure, institutional control of repositories.
Decree 167/2010	Govt. Decree 167/2010. (V. 11.) Korm. on the national nuclear emergency preparedness and response system

Italy

After benchmarking the Italian legal system to the WGWD safety reference levels for disposal during 41st WGWD meeting in Ljubljana in September 2018, Italy presented its self-assessment resulting in a total of 94 C-ratings. During the same 41st WGWD meeting the National Action Plan was presented: the NAP foresaw the implementation of the remaining C-ratings in the national legislations by the publication of a Technical Guide.

ISIN, which regulates the use of nuclear energy in Italy and gives detailed guidance in the form of legally binding guides, published in July 2022 the Technical Guide n. 32 “Safety and radiation protection criteria for near surface radioactive waste disposal facility”, to comply with the remaining disposal safety reference levels.

The implementation of the Italian NAP was reported during the 50th WGWD virtual meeting with the result that all disposal SRLs were established in the national legislation, as it is reflected in the table below.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	Art. 15 of Law 1860/60; Legislative Decree n. 101/2020, art.150
DI-02	A	Technical Guide n. 32/2021
DI-03	A	Technical Guide n. 32/2021
DI-04	A	Technical Guide n. 32/2021; Legislative Decree n. 101/2020, art. 102
DI-05	A	Legislative Decree n. 31/2010, art. 25, point 1 and 3
DI-06	A	Technical Guide n. 32/2021
DI-07	A	Legislative Decree n. 101/2020 art. 102; Technical Guide n. 32/2021
DI-08	A	Technical Guide n. 32/2021
DI-09	A	Law 1450 (1970); Legislative Decree n. 101/2020, articles 89, 91; Legislative Decree n. 31/2010, art. 28 comma 1; Technical Guide n. 32/2021
DI-10	A	Technical Guide n. 32/2021
DI-11	A	Technical Guide n. 32/2021
DI-12	A	Legislative Decree n. 101/2020, art. 103
DI-13	A	Legislative Decree n. 101/2020, art. 103
DI-14	A	Technical Guide n. 32/2021
DI-15	A	Technical Guide n. 32/2021
DI-16	A	Technical Guide n. 32/2021
DI-17	A	Technical Guide n. 32/2021
DI-18	A	Technical Guide n. 32/2021
DI-19	A	Technical Guide n. 32/2021
DI-20	A	Technical Guide n. 32/2021
DI-21	A	Legislative Decree n. 31/2010, art.28-bis comma 3
DI-22	A	Technical Guide n. 32/2021
DI-23	A	Technical Guide n. 32/2021
DI-24	A	Technical Guide n. 32/2021
DI-25	A	Technical Guide n. 32/2021
DI-26	A	Technical Guide n. 32/2021
DI-27	A	Technical Guide n. 32/2021
DI-28	A	Technical Guide n. 32/2021
DI-29	A	Technical Guide n. 32/2021
DI-30	A	Technical Guide n. 32/2021
DI-31	A	Technical Guide n. 32/2021
DI-32	A	Legislative Decree n. 31/2010 art.25 point 2; Technical Guide n. 32/2021
DI-33	A	Legislative Decree n. 31/2010 art. 27 points 10, 11, 13-bis; Technical Guide n.29/2014
DI-34	A	Technical Guide n. 32/2021
DI-35	A	Technical Guide n. 32/2021
DI-36	A	Technical Guide n. 32/2021
DI-37	A	Technical Guide n. 32/2021
DI-38	A	Technical Guide n. 32/2021
DI-39	A	Technical Guide n. 32/2021
DI-40	A	Technical Guide n. 32/2021
DI-41	A	Technical Guide n. 32/2021
DI-42	A	Technical Guide n. 32/2021

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-43	A	Technical Guide n. 32/2021
DI-44	A	Technical Guide n. 32/2021
DI-45	A	Technical Guide n. 32/2021
DI-46	A	Technical Guide n. 32/2021
DI-47	A	Technical Guide n. 32/2021
DI-48	A	Technical Guide n. 32/2021
DI-49	A	Technical Guide n. 32/2021
DI-50	A	Technical Guide n. 32/2021
DI-51	A	Technical Guide n. 32/2021
DI-52	A	Technical Guide n. 32/2021
DI-53	A	Technical Guide n. 32/2021
DI-54	A	Technical Guide n. 32/2021
DI-55	A	Technical guide n.29/2014; Technical Guide n. 32/2021
DI-56	A	Technical Guide n. 32/2021
DI-57	A	Technical Guide n. 32/2021
DI-58	A	Technical Guide n. 32/2021
DI-59	A	Technical Guide n. 32/2021
DI-60	A	Technical Guide n. 32/2021
DI-61	A	Technical Guide n. 32/2021
DI-62	A	Technical Guide n. 32/2021
DI-63	A	Technical Guide n. 32/2021
DI-64	A	Technical Guide n. 32/2021
DI-65	A	Technical Guide n. 32/2021
DI-66	A	Technical Guide n. 32/2021
DI-67	A	Technical Guide n. 32/2021
DI-68	A	Technical Guide n. 32/2021
DI-69	A	Technical Guide n. 32/2021
DI-70	A	Technical Guide n. 32/2021
DI-71	A	Technical Guide n. 32/2021
DI-72	A	Technical Guide n. 32/2021
DI-73	A	Technical Guide n. 32/2021
DI-74	A	Technical Guide n. 32/2021
DI-75	A	Technical Guide n. 32/2021
DI-76	A	Technical Guide n. 32/2021
DI-77	A	Technical Guide n. 32/2021
DI-78	A	Technical Guide n. 32/2021
DI-79	A	Technical Guide n. 32/2021
DI-80	A	Technical Guide n. 32/2021
DI-81	A	Technical Guide n. 32/2021
DI-82	A	Technical Guide n. 32/2021
DI-83	A	Technical Guide n. 32/2021
DI-84	A	Technical Guide n.29/2014; Technical Guide n. 32/2021
DI-85	A	Technical Guide n. 32/2021

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-86	A	Technical Guide n. 32/2021
DI-87	A	Technical Guide n. 32/2021
DI-88	A	Technical Guide n. 32/2021
DI-89	A	Technical Guide n. 32/2021
DI-90	A	Technical Guide n. 32/2021
DI-91	A	Technical Guide n. 32/2021
DI-92	A	Technical Guide n. 32/2021
DI-93	A	Technical Guide n. 32/2021
DI-94	A	Technical Guide n. 32/2021
DI-95	A	Technical Guide n. 32/2021
DI-96	A	Technical Guide n. 32/2021
DI-97	A	Technical Guide n. 32/2021
DI-98	A	Technical Guide n. 32/2021
DI-99	A	Technical Guide n. 32/2021
DI-100	A	Technical Guide n. 32/2021
DI-101	A	Technical Guide n. 32/2021
DI-102	A	Technical Guide n. 32/2021
DI-103	A	Technical Guide n. 32/2021
DI-104	A	Technical Guide n. 32/2021
DI-105	A	Technical Guide n. 32/2021
DI-105	A	Technical Guide n. 32/2021
DI-107	A	Legislative Decree n. 101/2020 Art. 80, Technical Guide n. 32/2021
DI-108	A	Technical Guide n. 32/2021

References

1	Legislative Decree 101/2020 and subsequent amendments
2	Legislative Decree 31/2010 and subsequent amendments
3	Law 1860/1962
4	Law 1450/1970
5	Technical Guide n.29 “Siting criteria for a near surface disposal facility for low and intermediate level radioactive waste”
6	Technical Guide n. 32 “Safety and radiation protection criteria for near surface radioactive waste disposal facilities”

Lithuania

Benchmarking of implementation of the Disposal SRLs in the Lithuanian framework was performed at WENRA WGWD meeting 38, and the result is reflected in the table below.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	LNS Articles 3, 16, 32, LNE Articles 30, 33
DI-02	A	LNS Articles 3, 30, MSR Article 44
DI-03	A	LNS Article 32.7
DI-04	A	LNS Articles 3, 5, 18, 30
DI-05	A	LNS Article 23.1

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-06	A	LNS Articles 3, 16, 22, 30, LNE Article 30, LMRW Article 21
DI-07	A	MSR Article 129
DI-08	A	MSR Article 20
DI-09	A	MSR Articles 20, 82
DI-10	A	MSR Section II Human resource management, Articles 56-69
DI-11	A	MSR Articles 62, 66
DI-12	A	MSR Articles 58, 66-69
DI-13	A	MSR Articles 100, 129
DI-14	A	MSR Articles 5, 7, 16, 17, 22, 23, 24, 27
DI-15	A	MSR Articles 6, 56, 82, 134
DI-16	A	MSR Articles 6, 22, 27
DI-17	A	MSR Articles 20, 23, 26, 100, 129, BSR 322 Article 25
DI-18	A	MSR Articles 6, 23
DI-19	A	Vatesi regulatory requirements P-2009-04
DI-20	A	BSR 322 Articles 26, 27
DI-21	A	BSR 322 Article 23
DI-22	A	LNS Articles 3, 30, BSR 322 Articles 7, 47
DI-23	A	BSR 322 Article 4
DI-24	A	BSR 322 Article 5
DI-25	A	LNS Article 30, BSR 322 Article 43
DI-26	A	BSR 322 Articles 12, 76, 77
DI-27	A	BSR 322 Articles 50, 78
DI-28	A	BSR 322 Article 10
DI-29	A	BSR 322 Article 16
DI-30	A	BSR 322 Article 79
DI-31	A	BSR 322 Article 33
DI-32	A	LNS Article 32.1
DI-33	A	BSR 322 Article 60
DI-34	A	BSR 322 Articles 70, 71
DI-35	A	BSR 322 Article 88
DI-36	A	BSR 322 Article 53
DI-37	A	BSR 322 Article 55
DI-38	A	BSR 322 Article 78
DI-39	A	BSR 322 Article 81
DI-40	A	BSR 322 Article 91
DI-41	A	BSR 322 Article 84
DI-42	A	BSR 322 Article 12
DI-43	A	BSR 322 Article 82
DI-44	A	BSR 322 Article 3.3, 20
DI-45	A	LNS Articles 3.5, BSR 322 Article 86
DI-46	A	BSR 322 Articles 76, 85
DI-47	A	BSR 322 Article 60
DI-48	A	BSR 322 Article 22

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-49	A	BSR 322 Article 22
DI-50	A	BSR 322 Article 91
DI-51	A	BSR 322 Article 89
DI-52	A	BSR 322 Article 90
DI-53	A	RM - BSR Articles 1, 6
DI-54	A	LNE Article 30.1, BSR 322 Article 101
DI-55	A	REP Articles 3, 4, 24.5.7
DI-56	A	BSR 322 Article 90
DI-57	A	BSR 322 Article 38
DI-58	A	LNS Articles 3, 32.3, BSR 322 Articles 35, 93
DI-59	A	BSR 322 Article 110
DI-60	A	RM - BSR Articles 1, 6
DI-61	A	RM - BSR Articles 1, 6
DI-62	A	REP Articles 4, 5
DI-63	A	REP Articles 22, 23.1, 24.6
DI-64	A	LNS Articles 38.4, REP Articles 26, 27
DI-65	A	BSR 322 Article 104
DI-66	A	BSR 322 Article 105
DI-67	A	BSR 322 Article 106
DI-68	A	BSR 322 Article 109
DI-69	A	BSR 322 Articles 111, 113
DI-70	A	BSR 322 Article 109
DI-71	A	RM - BSR Articles 1, 6
DI-72	A	BSR 322 Articles 116, 120
DI-73	A	BSR 322 Articles 122, 123
DI-74	A	BSR 322 Annex 1 paragraph 9, Annex 3 paragraph 13
DI-75	A	BSR 322 Article 28
DI-76	A	BSR 322 Article 1, 2, Annex 2 article 3
DI-77	A	BSR 322 Articles 12, 30, 31
DI-78	A	BSR 322 Article 34
DI-79	A	BSR 322 Article 35
DI-80	A	BSR 322 Article 26
DI-81	A	BSR 322 Articles 21, 22
DI-82	A	BSR 322 Article 34
DI-83	A	LNS, Chapter Six, Articles 30, 32
DI-84	A	BSR 322 Article 47
DI-85	A	LNS Article 30, BSR 322 Article 42
DI-86	A	BSR 322 Annex 1, paragraphs 12, 16, 19, 50, 53, 76, 86
DI-87	A	BSR 322 Annex 1
DI-88	A	BSR 322 Article 45
DI-89	A	BSR 322 Articles 37, 40
DI-90	A	BSR 322 Articles 37, 40
DI-91	A	BSR 322 Annex 1, paragraphs 4, 7, 13, 14

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-92	A	BSR 322 Article 46
DI-93	A	BSR 322 Article 43
DI-94	A	BSR 322, Section XII, Articles 109, 110
DI-95	A	BSR 322 Annex 1, paragraph 19
DI-96	A	BSR 322 Article 51
DI-97	A	LNS Article 32.7, 55, 56
DI-98	A	LNS Article 32.7, 55, 56
DI-99	A	RM - BSR Articles 1, 6
DI-100	A	BSR 322 Article 6
DI-101	A	BSR 322 Article 53
DI-102	A	BSR 322 Articles 8, 44
DI-103	A	BSR 322 Article 39
DI-104	A	BSR 322 Articles 30, 46, 78
DI-105	A	BSR 322 Article 39
DI-106	A	BSR 322 Article 56
DI-107	A	BSR 322 Annex 4
DI-108	A	BSR 322 Annex 4

References

LNS	The Law on Nuclear Safety, 2011
LNE	The Law on Nuclear Energy, 2011
LMWR	The Law on the Management of Radioactive Waste, 2011
BSR 322	Requirements for Emplacement of Radioactive Waste to Radioactive Waste Disposal Facilities, 2016
MSR	Nuclear Safety Requirements BSR-1.4.1-2010 "Management system requirements" (Applicable to all nuclear facilities also to disposal facilities)
RM	RM - BSR-1.8.2-2015, Requirements for Modifications of Nuclear Facilities, 2015 (Applicable to all nuclear facilities also to disposal facilities)
REP	REP - P-2008-01, Emergency preparedness and response requirements for the operators of nuclear facilities, 2008, (Applicable to all nuclear facilities also to disposal facilities)

The Netherlands

Since 1984 the Dutch policy regarding disposal of radioactive waste and spent fuel was storage of radioactive waste in one dedicated central storage facility (COVRA, Central Organisation for Radioactive Waste) for about 100 years. The Dutch cabinet will decide on a location for a geological disposal facility and the technical preconditions for waste management in 2050. At the end of 2027, a robust plan (AERA, Action program Disposal Radioactive Waste) will be presented to Parliament to achieve these goals.

The policy decisions regarding the disposal facility are included in the national framework for waste management and are part of the first National Programme on Radioactive Waste (following Euratom 2011/70) of which a new version is expected to be published in 2026. For now, no legislation on the requirement for the disposal facility has been implemented, but this will change in the near future with the implementation of the AERA Plan.

So, although currently there is only very limited legislation on disposal to benchmark, this will presumably change in the future. At that time, the Netherlands will participate in the benchmarking of the WENRA disposal SRLs.

Romania

Nuclear safety legislation in Romania was subject to a continuous development process both due to the planning of new nuclear facilities and due to implementation of the European legislation. Romania committed itself to implement the WGWD safety reference levels on RW and decommissioning in its legal system.

In order to meet the requirements of 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, CNCAN as the nuclear regulatory authority of Romania developed new regulations and revised the existing regulations in the field of predisposal and disposal of radioactive waste and in the field of decommissioning of nuclear and radiological facilities.

In order to meet the requirements of Council Directive 2014/87/EURATOM from 06 July 2014, establishing a common European framework for nuclear safety CNCAN developed new basic regulation on nuclear safety for nuclear facilities (CNCAN Order No. 114/2017 - NSN 21).

The Council Directive 2013/59/EURATOM of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionizing radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom has been transposed and implemented into the legal and regulatory framework by issuing the new regulation regarding the basic requirements for radiation safety (approved by the joint order of the Ministry of Health, Ministry of National Education and CNCAN, No. 752/3978/136/2018) and a series of new regulations and revision of the existing ones.

The nuclear regulatory control in Romania is established by the Law no. 111/1996 on the safe deployment, regulation, licensing and control of nuclear activities and on the regulations issued by CNCAN Orders. The law clearly stipulates that the prime responsibility for the safety rests with the licensees.

Romania has completed the revision of the entire regulatory framework on the safety of predisposal and disposal of radioactive waste and on the safety of decommissioning of nuclear facilities.

In the field of disposal of radioactive waste, the process was finalized in 2019 by publishing the **Regulation on the safety requirements for disposal of radioactive waste (NDR-05)**, approved by the CNCAN Order no. 11/2019.

The safety and licensing requirements on disposal of radioactive waste cover both nuclear and radiological facilities. Graded approach is applying and for the nuclear facilities they are applying together with the nuclear safety regulations.

This regulation contains safety requirements as well as licensing requirements for disposal of radioactive waste. The scope, domain and definitions are described in the first chapter. The next chapters describe the concept of graded approach as well as the requirements for management system such as responsibilities of licensee, integrated management system, safety culture, and operational structure. Safety requirements for each step in the development of a facility such as siting, design, construction, commissioning, operation and closure are established.

Safety verification chapter introduces the concept of safety case and safety assessment and contains general requirements for development of these documents.

The last chapter dedicated to licensing is based on national nuclear law and details the content of application and necessary supporting documents which have to be submitted by an applicant.

The regulation is based on IAEA SSR 5 Disposal of radioactive waste as well and WGWD – Disposal SRLs.

Benchmarking of implementation of the Disposal SRLs in the Romanian framework was performed at WENRA WGWD meeting 42, and the result is reflected in the table below.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	Law 111/1996, Art. 25(3), NDR-05, Art. 11
DI-02	A	Law 111/1996, republished, Art. 25(1), NDR-05, Art. 13
DI-03	A	NDR-05, Art. 14
DI-04	A	NDR-05, Art. 12
DI-05	A	Law 111/1996, republished, Art. 25(1), NDR-05, Art. 15
DI-06	A	NDR-05, Art. 16
DI-07	A	NDR-05, Art. 17
DI-08	A	NDR-05, Art. 18
DI-09	A	NDR-05, Art. 21
DI-10	A	NDR-05, Art. 22
DI-11	A	NDR-05, Art. 23
DI-12	A	NDR-05, Art. 24
DI-13	A	NDR-05, Art. 25
DI-14	A	NDR-05, Art. 26
DI-15	A	NDR-05, Art. 28
DI-16	A	NDR-05, Art. 27, Art. 29 (1), (2), (3)
DI-17	A	NDR-05, Art. 28
DI-18	A	NDR-05, Art. 81, 82, 94
DI-19	A	NDR-05, Art. 14, 29 (1)
DI-20	A	NDR-05, Art. 28

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-21	A	NDR-05, Art. 34
DI-22	A	NDR-05, Art. 1, 2, 7, 8 (1)
DI-23	A	NDR-05, Art. 38 (1), (2), (3)
DI-24	A	NDR-05, Art. 39 (1)
DI-25	A	NDR-05, Art. 40
DI-26	A	NDR-05, Art. 37
DI-27	A	NDR-05, Art. 55, Art. 131
DI-28	B	NDR-01, Art. 41 (1), (2)
DI-29	A	NDR-05, Art. 42 (1), Art. 68 (1)
DI-30	A	NDR-05, Art. 80, Art. 110
DI-31	A	NDR-05, Art. 64
DI-32	A	NDR-05, Art. 46 (1), (2)
DI-33	A	NDR-05, Art. 47
DI-34	A	NDR-05, Art. 52 (1), Art.53
DI-35	A	NDR-05, Art. 54
DI-36	A	NDR-05, Art. 55
DI-37	A	NDR-05, Art. 56
DI-38	A	NDR-05, Art. 57
DI-39	A	NDR-05, Art. 58
DI-40	A	NDR-05, Art. 59
DI-41	A	NDR-05, Art. 60
DI-42	A	NDR-05, Art. 65
DI-43	A	NDR-05, Art. 62
DI-44	A	NDR-05, Art. 61
DI-45	A	NDR-05, Art. 66, Art.67
DI-46	A	NDR-05, Art. 63
DI-47	A	NDR-05, Art. 47
DI-48	A	NDR-05, Art. 69, Art. 73, Art.74
DI-49	A	NDR-05, Art. 68
DI-50	A	NDR-05, Art. 76
DI-51	A	NDR-05, Art. 77
DI-52	A	NDR-05, Art. 78
DI-53	A	NDR-05, Art. 81 (1), (2)
DI-54	A	NDR-05, Art. 91
DI-55	A	NDR-05, Art. 99 (1), (2)
DI-56	A	NDR-05, Art. 96
DI-57	A	NDR-05, Art. 92
DI-58	A	NDR-05, Art. 82, Art. 94
DI-59	A	NDR-05, Art. 93
DI-60	A	NDR-05, Art. 103 (2)
DI-61	A	NDR-05, Art. 103 (1), (2), Art.104 (1), (2)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-62	A	NDR-05, Art. 100 (1), (2), (3)
DI-63	A	NDR-05, Art. 101
DI-64	A	NDR-05, Art. 102 (1)
DI-65	A	NDR-05, Art. 105
DI-66	A	NDR-05, Art. 106 (1)
DI-67	A	NDR-05, Art. 107
DI-68	A	NDR-05, Art. 108 (1), (2), (3)
DI-69	A	NDR-05, Art. 109
DI-70	A	NDR-05, Art. 110
DI-71	A	NDR-05, Art. 111
DI-72	A	NDR-05, Art. 112 (1), (2)
DI-73	A	NDR-05, Art. 114
DI-74	A	NDR-05, Art. 53, Art. 84 (2)
DI-75	A	NDR-05, Art. 84 (1), (3)
DI-76	A	NDR-05, Art. 85
DI-77	A	NDR-05, Art. 86
DI-78	A	NDR-05, Art. 104 (1), (2)
DI-79	A	NDR-05, Art. 88 (1), (2)
DI-80	A	NDR-05, Art. 90
DI-81	A	NDR-05, Art. 87
DI-82	A	NDR-05, Art. 89 (1)
DI-83	A	NDR-05, Art. 115, Art. 116
DI-84	A	NDR-05, Art. 118
DI-85	A	NDR-05, Art. 119 (1), (2)
DI-86	A	NDR-05, Art. 120
DI-87	A	NDR-05, Art. 121 (1), (2)
DI-88	A	NDR-05, Art. 122 (1), (2), (3)
DI-89	A	NDR-05, Art. 123
DI-90	A	NDR-05, Art. 124
DI-91	A	NDR-05, Art. 125
DI-92	A	NDR-05, Art. 126 (1), (2), (3)
DI-93	A	NDR-05, Art. 127
DI-94	A	NDR-05, Art. 128 (1), (2)
DI-95	A	NDR-05, Art. 129
DI-96	A	NDR-05, Art. 68 (1)
DI-97	A	NDR-05, Art. 117 (2), (3)
DI-98	A	NDR-05, Art. 117 (1)
DI-99	A	NDR-05, Art. 130
DI-100	A	NDR-05, Art. 131
DI-101	A	NDR-05, Art. 132
DI-102	A	NDR-05, Art. 133

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-103	A	NDR-05, Art. 134
DI-104	B	NDR-05, Art. 57
DI-105	A	NDR-05, Art. 135
DI-106	A	NDR-05, Art. 137 (1), (2)
DI-107	A	NDR-05, Art. 138
DI-108	A	NDR-05, Art. 139

References

Law no. 111/1996	Law no. 111/1996 on safe deployment, regulation, licensing and control of nuclear activities, republished, with subsequent modifications and completions
NDR-05	NDR-05: Regulation on the safety requirements for disposal of radioactive waste, approved by CNCAN Order 11/2019
NDR-01	NDR-01: Fundamental regulation on the safe management of radioactive waste and spent nuclear fuel, approved by CNCAN Order no. 56/2004, republished, with subsequent completions and modifications, the last update – CNCAN Order 74/2022

Slovakia

The Atomic Act (Act No. 541/2004 Coll., as amended) requires that radioactive waste may only be disposed of in licensed facilities and mandates that all stages of disposal—from siting and design through operation, closure, and institutional control—are supported by a comprehensive and continuously updated safety case and safety assessment demonstrating long-term operational and post-closure safety.

Further detailed requirements for radioactive waste disposal facilities are set out in ÚJD SR Decree No. 430/2011 Coll., as amended, on nuclear safety requirements. This decree establishes general and specific requirements for the design, construction, operation, and closure of repositories, including the application of a defence-in-depth concept based on multiple safety barriers.

Specific regulatory requirements are further detailed in ÚJD SR Decree No. 30/2012 Coll., as amended, which sets out requirements for safety documentation, safety analyses, and the supporting basis for licensing decisions, including those related to radioactive waste disposal facilities. The decree requires that disposal is conducted only in authorised facilities and in accordance with approved safety documentation. It also requires that waste is properly characterised, classified, and documented to ensure compatibility with disposal facility acceptance criteria and the associated safety case. Furthermore, disposal activities must be supported by safety analyses demonstrating compliance with nuclear safety and radiation protection requirements, including assurance of long-term post-closure safety. The decree also ensures traceability of waste streams, integrates disposal within the broader radioactive waste management system, and requires operational controls to minimise exposures in line with the ALARA principle.

Out of 108 Disposal Safety Reference Levels (SRLs), Slovakia complies with 105 SRLs. Three SRLs were assessed as not fully compliant with the complete wording of the corresponding SRLs and were therefore rated as C. These relate to the explicit consideration of the impact of safeguards measures on operational and post-closure safety (DI-31), the review of security and safeguards programmes prior to decommissioning and closure (DI-69), and the collection of information during construction to refine assumptions used in the safety case (DI-52). These observations will be considered in future updates of the Slovak legislative and regulatory framework.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	Act No. 541/2004 Coll. as amended § 4 (3) letters a), b), c), e). Licensee is demonstrating that the adequate level of safety of disposal facility is achieved in the safety case documentation as is required to be submitted for approval to regulatory body for each phase of the life time of disposal facility. (Annexes 1, letters A, B, C and E to the Atomic act). The operator shall carry out safety assessment and develop and maintain a safety case throughout all stages of development of the facility. Decree of the ÚJD SR No. 30/2012 Coll as amended, Section 10 para 2) Act No. 541/2004 Coll. as amended § 22 In order to grant the license for repository closure, the complete set of documentation as referred to in Annex 1, letter E of the Atomic act has to be submitted to regulatory body for approval. The safety assessment has to demonstrate that the facility will continue to be safe also after closure.
DI-02	A	Act No. 541/2004 Coll. as amended § 10 (1) letters b) and t) Programs and procedures important to safety (e.g. waste management program, experience feedback program, monitoring program) are part of the documentation to be submitted for individual decisions (Annex 1, letters A, B, C and E to the Atomic Act). The changes to those programs are subject of regulatory approval.
DI-03	A	Act No. 541/2004 Coll. as amended § 10 (1) letters t), u) and §23 (2) letter f)
DI-04	A	Act No. 541/2004 Coll. as amended §23(2) letter e) Act No. 541/2004 Coll. as amended § 10 (1) letter t) Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended. letter D) Proven engineering practices and operational experience
DI-05	A	Act No. 541/2004 Coll. as amended §23(2) a)
DI-06	A	Act No. 541/2004 Coll. as amended § 22 (4) c) and § 23 (5) Decree of the ÚJD SR No. 430/2011 Coll.as amended Annex 4, part III., letter E (7)
DI-07	A	Act No. 541/2004 Coll. as amended §23 (1) and (2) letters b), u) Decree of the ÚJD SR No.431/2011 Coll. as amended Annex 1(a, b) To be specified
DI-08	A	Act No.541/2004 Coll. as amended §23 (2) letters u) and v) Decree of the ÚJD SR No. 431/2011 Coll. as amended §2 (7) letters aa) to ae)
DI-09	A	Act No.541/2004 Coll. as amended § 25 (6) Decree No. 431/2011 Coll. as amended §3(9,10)
DI-10	A	Act No.541/2004 Coll. as amended §24 (1,18) Decree of the ÚJD SR No. 52/2006 Coll. as amended § (3)
DI-11	A	Act No.541/2004 Coll. as amended §24 Decree of the ÚJD SR No. 52/2006 Coll. as amended § (5)
DI-12	A	Act No.541/2004 Coll. as amended §24 Decree of the ÚJD SR No. 52/2006 Coll. as amended § (11)
DI-13	A	Act No.541/2004 Coll. as amended §23 (2) letter b)
DI-14	A	Act No.541/2004 Coll. as amended § 23 (2) letter c), f) and h) Decree of the ÚJD SR No. 431/2011 Coll. as amended § 3 (8)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-15	A	Act No.541/2004 Coll. as amended §23 (2 f) Decree of the ÚJD SR No. 431/2011 Coll. as amended §3 (8) Annex 4, part II, letters c) and i) Decree of the ÚJD SR No. 430/2011 Coll. Annex 3, part B/I. A (10) I. GENERAL REQUIREMENTS FOR THE DESIGN OF NUCLEAR FACILITIES Part A). Basic nuclear safety requirements (10)
DI-16	A	Decree of the ÚJD SR No. 431/2011 Coll. as amended § 2 + Annex 1, § 3 (3,9,10,12) and § 4 (2) letters b) and c)
DI-17	A	Decree of the ÚJD SR No. 431/2011 Coll. as amended § 2+ Annex 1 letters aa) to ae) + letters s), t) o, p q) + 3 (3)
DI-18	A	Act No.541/2004 Coll. as amended §23 (2) letter h) + Annex 1 letter C) Programs as referred under letters c), d) and e)
DI-19	A	Act No.541/2004 Coll. as amended §10 (1) c) Experience feedback program - Decree No. 431/2011 Coll. as amended Annex1 letter j) Operational and post-closure safety - Decree No. 430/2011 Coll. as amended § 1 (2) + Annex 3 B/III letter h) (page29) + Decree No. 30/2012 Coll. as amended § 10(2) Experience from other facilities shall also be considered as appropriate Decree No. 430/2011 Coll. as amended Annex 3-part B/I. letter D) (2) and E)
DI-20	A	Act No. 541/2004 Coll. as amended -§ 22 (4a) – closure phase; Design basis and design phase - preoperational SAR- Decree No. 58/2006 Coll. as amended § 19 letters d) and f), Design, construction, commissioning, closure phase - Decree No. 430/2011Coll. as amended - Annex 4, As build construction - drawings with as-built discrepancies marked - Decree No. 431/2011 Coll. Annex 8, part A; Act No.541/2004 annex No.1 letter E)
DI-21	A	Act No. 541/2004 Coll. as amended §20 (6)
DI-22	A	Act No. 541/2004 Coll. as amended §3(4,5) Annex 3 to Decree No. 430/2011 Coll. letter G)
DI-23	A	Annex No. 3 to the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design, letters d), e), h) Act No. 541/2004 Coll. as amended §23 (2) Decree of the ÚJD SR No. 51/2006 Coll. § 5 (4) Decree of the ÚJD SR No. 58/2006 Coll. as amended § 33 letter b)
DI-24	A	Annex No. 3 to the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design, letters d), e), h)
DI-25	A	Annex No. 1to the Act No. 541/2004 Coll. as amended, letter E) letter c) Annex No. 3 to the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design, letters c), i) Decree of the ÚJD SR No. 30/2012 Coll. as amended § 12 (1) and § 10 (2,3, 4, 5 and 6) Act No. 87/2018 Coll. as amended (Radiation Protection Act) § 1 (2) different exposure situations
DI-26	A	Act No. 541/2004 Coll. as amended § 23a (6, 10) Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design Annex 4 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design, letter E

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-27	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (2) Annex No. 3 to the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design, letters c), i) Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design, letter e) Decree of the ÚJD SR No. 30/2012 Coll. as amended § 10 (2 to 6)
DI-28	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended § 10 (2) Annex No. 3 to the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design, letter c), i), k)
DI-29	A	Act No. 541/2004 Coll. as amended § 10 (1) letter t)
DI-30	A	Annex No. 4 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, Part B., I. General requirements for nuclear installations, letter A (15)
DI-31	C	WGWD concluded that references to Act No. 541/2004 Coll., as amended, in §13 and §21(3) do not explicitly address the requirement that the licensee shall ensure that any measures necessary for the accounting for and control of nuclear material do not unacceptably affect operational and post-closure safety.
DI-32	A	Decree of the ÚJD SR No. 58/2006 Coll. as amended § (4) Act No. 541/2004 Coll. as amended § 18 (3)
DI-33	A	Decree of the ÚJD SR No. 58/2006 Coll. as amended § (4) Act No. 541/2004 Coll. as amended § 18 (3)
DI-34	A	Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design Decree of the ÚJD SR No. 58/2006 Coll. as amended § 2 and § 3
DI-35	A	Act No. 541/2004 Coll. as amended § 18 (3) Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, PART B CONTENT OF REQUIREMENTS, part I. General requirements for nuclear installations, letter A (10) and letter B (1-3) and part III. Special requirements for repository design
DI-36	A	Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design Act No. 541/2004 Coll. as amended § 18 (3) Decree of the ÚJD SR No. 30/2012 Coll. as amended § 10 (2)
DI-37	A	Annex No.3 to the Decree of the ÚJD SR No. 430/2011 Coll. as amended part B, letter A (12) and part B/III. b) Special requirements for repository design
DI-38	A	Act No. 541/2004 Coll. as amended § 18 (3) Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design Decree of the ÚJD SR No. 30/2012 Coll. as amended § 2 (1,2)
DI-39	A	Decree of the ÚJD SR No. 430/2011 Coll as amended § 3 (1)
DI-40	A	Act No. 541/2004 Coll. as amended § 10 (1) letter t) Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, PART B CONTENT OF REQUIREMENTS, part I. General requirements for nuclear installations, letter A (22), D (2), E
DI-41	?	Act No. 541/2004 Coll. as amended §17, 18
DI-42	A	Act No. 541/2004 Coll. as amended § 18 (3)
DI-43	A	Annex No. 4 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, PART B CONTENT OF REQUIREMENTS, part I. General requirements for nuclear installations, H - Regular maintenance, inspections and tests

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-44	A	Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design, letter g)
DI-45	A	Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part III. Special requirements for repository design, letter g)
DI-46	A	Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part I. GENERAL REQUIREMENTS FOR THE DESIGN OF NUCLEAR FACILITIES, letter G (1) + Annex No. 4, H (1, 2) – easy maintenance and inspection Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part I. GENERAL REQUIREMENTS FOR THE DESIGN OF NUCLEAR FACILITIES, letter. B (3)
DI-47	A	Act No. 541/2004 Coll. as amended § 7 (3) a) *EIA (Act No.24/2006 Z. z.§31(2) Decree of the ÚJD SR No. 430/2011 Coll.as amended §4 and §5
DI-48	A	Annex No. 3 to the Decree of the ÚJD SR No. 430/2011 Coll.as amended, part I. GENERAL REQUIREMENTS FOR THE DESIGN OF NUCLEAR FACILITIES, letters A(19) +B/III letter g) B/I. letter G(g)
DI-49	A	Act No. 541/2004 Coll. as amended § 7 (3) a) *EIA (Act No.24/2006 Z. z.§31(2) Decree of the ÚJD SR No. 430/2011 Coll.as amended §4 and §5
DI-50	A	Act No. 541/2004 Coll. as amended Section 17a-Authorisation for the Siting of a Nuclear Installation Section 18- Approval for construction of nuclear installations § 18a- Verification of the project of nuclear installation
DI-51	A	Decree of the ÚJD SR No. 430/2011 Annex 3, part B/III letter b) + Construction Act § 43 d + § 76 (1)
DI-52	C	WGWD concluded that there is no evidence that information mentioned in Di-52 (The intrinsic properties of the host environment and the response of the host environment to the presence of the disposal facility) is gathered during construction to refine assumptions of the safety case. In reference - Decree of the ÚJD SR No. 30/2012 Coll. as amended § 10 (8) – is the construction phase missing.
DI-53	A	Act No. 541/2004 Coll. as amended § 4 (2) letter a) item 13) + ÚJD SR Decree of the ÚJD SR No. 30/2012 Coll. as amended § 10 (5) + Decree of the ÚJD SR No. 431/2011 Coll. as amended § 9 (3) – Management of modifications
DI-54	A	Act No. 541/2004 Coll. as amended, Annex No. 1. part B) letters a), part C),
DI-55	A	Act No. 541/2004 Coll. as amended § 23 (2) letter p) + q) – detection and analysis Act No. 541/2004 Coll. as amended § 27 (4) letters d) + e) – provisions
DI-56	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended § 10 (8)
DI-57	A	Decree of the ÚJD SR No.58/2006 Coll. §14- Limits and conditions of safe operation
DI-58	A	Decree of the ÚJD SR No.58/2006 Coll. §5 - Reference report on the method of handling radioactive waste and spent nuclear fuel
DI-59	A	Decree of the ÚJD SR No. 58/2006 Coll. § 32 b)
DI-60	A	Act No. 541/2004 Coll. as amended §23 (2) n; Decree of the ÚJD SR No. 30/2012 Coll. as amended § 10 (5,6) Decree of the ÚJD SR No. 430/2011 Coll. as amended § 9 – Management of modifications
DI-61	A	Act No. 541/2004 Coll. as amended §23(2) l);

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-62	A	Act No. 541/2004 Coll. as amended §23(2) o)1-4; Decree of the ÚJD SR No. 55/2006 Coll. as amended § 13 (1) Act No. 541/2004 Coll. as amended § 28 (3) letter c) + § 28 (6,7)
DI-63	A	Act No. 541/2004 Coll. as amended §28(6,7,8);
DI-64	A	Act No. 541/2004 Coll. as amended § 4(3) letter i) + 28 (23)
DI-65	A	Act No. 541/2004 Coll. as amended §23(2)h + §27(4)e; Decree of the ÚJD SR No. 431/2011 Coll. as amended § 3 (2) letter a) + § 4 (2) letter e)
DI-66	A	Act No. 541/2004 Coll. as amended §27(4) e) + §28(14)
DI-67	A	Act No. 541/2004 Coll. as amended §28(14)
DI-68	A	Act No. 541/2004 Coll. as amended §22(3), Annex 1, letter E) -Implicitly through safety assessment
DI-69	C	WGWD concluded that a reference to programs for security and safeguards is missing in the requirements for review prior to the initiation of decom-missioning and closure of disposal facility.
DI-70	A	Act No. 541/2004 Coll. as amended §22(3) + annex 1 letter E)
DI-71	A	Decree of the ÚJD SR No. 431/2011 Coll. as amended § 9 (3) – Management of modifications
DI-72	A	Act No. 541/2004 Coll. as amended §22(3) Decree of the ÚJD SR No. 58/2006 Coll. as amended, § 33 - Monitoring pro-gramme, including proposed possible corrective measures
DI-73	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (2) Act No. 541/2004 Coll. as amended § 22(4) letter c)
DI-74	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §14 (2)
DI-75	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §8 (4), §10 (2), § 12 (2)
DI-76	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (2); §12(2,3,4)
DI-77	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (2) + § 12 (4)
DI-78	A	Act No. 541/2004 Coll. as amended §10 k) l); Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (5)
DI-79	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1) + §14 (1-6)
DI-80	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §9 (6) + §13 (2) b);
DI-81	A	Act No. 541/2004 Coll. as amended § 21 (1) Decree of the ÚJD SR No. 30/2012 Coll. as amended §14 (1-6)
DI-82	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §12 (2) d)
DI-83	A	Act No. 541/2004 Coll. as amended §23 (2) f) Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (2) Decree of the ÚJD SR 58/2006 as amended §19 (2)
DI-84	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (2) Decree of the ÚJD SR 58/2006 as amended §19 (2)
DI-85	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6) Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2)
DI-86	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2)
DI-87	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2)
DI-88	A	Decree No. 30/2012 Coll. as amended § 10 (2, 5)
DI-89	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2)

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-90	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2)
DI-91	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2) Annex 3 to Decree No. 430/2011 Coll. as amended I. General design requirements for nuclear facilities A. Basic nuclear safety requirements (10)
DI-92	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2)
DI-93	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2) Annex 3 to the Decree 430/2011 Coll. as amended G. Radiation protection, ventilation systems and filtration systems (1-4)
DI-94	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2)
DI-95	A	Act No. 541/2001 Coll. as amended §3 (4,5) Decree of the ÚJD SR No. 30/2012 Coll. as amended §3 (10) 2
DI-96	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2) Act No. 541/2001 Coll. as amended § 23 2(f)
DI-97	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2) Act No. 541/2001 Coll. as amended § 23 2(f)
DI-98	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2) Act No. 541/2001 Coll. as amended § 23 2(f)
DI-99	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended §10 (1-6); Decree of the ÚJD SR 58/2006 as amended §2(2) b) + §19 (2) Act No. 541/2001 Coll. as amended § 23 2(f)
DI-100	A	Decree of the ÚJD SR No. 33/2012 Coll. as amended §10 (2) g) h) i) k) Decree of the ÚJD SR No. 30/2012 Coll. as amended § 10 (2) Decree of the ÚJD SR No.430/2011 Coll. as amended, Annex 3 G. Radiation protection, ventilation systems and filtration systems (1)
DI-101	A	Decree of the ÚJD SR No. 30/2012 Coll. as amended, Section 10 - Disposal of radioactive waste (2,3,4) – repository analyses
DI-102	A	Act No. 541/2001 Coll. as amended §23a (6,10) Decree of the ÚJD SR No. 33/2012 Coll. as amended §10 (2) f) Decree of the ÚJD SR No. 51/2006 Coll. as amended §5(1)
DI-103	A	Decree of the ÚJD SR No. 33/2012 Coll. as amended §2 (1) Decree of the ÚJD SR No. 30/2012 Coll. as amended § 10 (3)
DI-104	A	Decree of the ÚJD SR No. 33/2012 Coll. as amended §10 Decree of the ÚJD SR No. 30/2012 Coll. as amended § 10 (1,2,3) and § 21 (3) a) Maintain subcriticality
DI-105	A	Decree of the ÚJD SR No. 430/2011, Annex No.3, Part. B, I., letter L) 12,
DI-106	A	Decree of the ÚJD SR No33/2012. as amended §1, §2 (1)
DI-107	A	Decree of the ÚJD SR No33/2012. as amended § 1, § 2
DI-108	A	Decree of the ÚJD SR No33/2012. as amended § 2 (9)

Act No. 541/2004 Coll. as amended	**Act No. 541/2004 Coll**. on the Peaceful use of nuclear energy **(Atomic Act)** and on the amendments and supplements to some acts as amended **Published: 16. October 2004** **Time version after incorporation of amendments effective from: 01 July 2026** **Amendments of the Atomic Act:** Act. No. 541/2004 Coll., Act No. 238/2006 Coll., Act No. 21/2007 Coll., Act No. 94/2007 Coll., Act No. 335/2007 Coll., Act No. 408/2008 Coll., Act No. 120/2010 Coll., Act No. 137/2010 Coll. (indirect amendment), Act No. 145/2010 Coll., Act No. 350/2011 Coll., Act No. 143/2013 Coll., Act No. 314/2014 Coll., Act No. 54/2015 Coll., Act No. 91/2016 Coll., Act No. 125/2016 Coll., Act No. 96/2017 Coll., Act No. 18/2018 Coll., Act No. 87/2018 Coll., Act No. 177/2018 Coll., Act No. 308/2018 Coll., Act No. 279/2019 Coll., Act No. 363/2021 Coll., Act No. 310/2021 Coll., Act. No. 146/2023 Coll., 205/2023 Coll., Act No. 309/2023 Coll. – effective until 31 March 2025, Act. No. 161/2024 Coll. and 366/2024 Coll., Act No. 26/2025 Coll., Act No. 116/2026 Coll.
Decree of the ÚJD SR No. 48/2006 Coll. as amended	**Decree of the ÚJD SR No. 48/2006 Coll.** as amended by Decree No. 32/2012 Coll. Laying Down Details on the Manner of Reporting Operational Events and Events in Transportation and Details of Ascertaining Causes Thereof (consolidated version) **Published: 08 February 2006** **Time version of the regulation effective from: 01 March 2012**
Decree of the ÚJD SR No. 51/2006 Coll.	**Decree of the ÚJD SR No. 51/2006 Coll.** Laying Down Details of Requirements for Provision of Physical Protection (consolidated version) **Published: 08 February 2006** **Time version of the regulation effective from: 01 March 2006**
Decree of the ÚJD SR No. 52/2006 Coll. as amended	**Decree of the ÚJD SR No. 52/2006 Coll.** effective from 1. 1. 2024 as amended by Decree No. 34/2012 Coll., Decree No. 410/2019 Coll. and Decree No. 355/2023 Coll. on professional competence (consolidated version) **Published: 08 February 2006** **Time version of the regulation effective from: 01 January 2024**
Decree of the ÚJD SR No. 54/2006 Coll.	**Decree of the ÚJD SR No. 54/2006 Coll.** on Record Keeping and Checking of Nuclear Materials and on Notification of Selected Activities (consolidated version) **Published: 08 February 2006** **Time version of the regulation effective from: 01 March 2006**
Decree of the ÚJD SR No. 55/2006 Coll. as amended	**Decree of the ÚJD SR No. 55/2006 Coll.** as amended by Decree No. 35/2012 Coll., Decree No. 9/2018 Coll. and Decree No. 310/2022 Coll. Laying down details in emergency planning for the event of an incident or an accident (consolidated version) **Published: 08 February 2006** **Time version of the regulation effective from: 01 October 2022**
Decree of the ÚJD SR No. 57/2006 Coll. as amended	**Decree of the ÚJD SR No. 57/2006 Coll.** as amended by Decree No. 105/2016 Coll. laying down details of the requirements for the transportation of radioactive materials (consolidated version) **Published: 08 February 2006** **Time version of the regulation effective from: 01 March 2016**

Decree of the ÚJD SR No. 58/2006 Coll. as amended	**Decree of the ÚJD SR No. 58/2006 Coll.** as amended by Decree No. 31/2012 Coll., Decree No. 102/2016 Coll. and Decree No. 155/2022 Coll. Laying Down Details on the Scope, Contents, and Manner of Maintaining Documentation of Nuclear Installations Necessary for Individual Decisions (consolidated version) **Published: 08 February 2006** **Time version of the regulation effective from: 15 May 2022**
Decree of the ÚJD SR No. 430/2011 Coll.as amended	**Decree of the ÚJD SR No. 430/2011 Coll.** as amended by Decree No. 103/2016 Coll. on nuclear safety requirements (consolidated version) **Published: 30 November 2011** **Time version of the regulation effective from: 01 March 2016**
Decree of the ÚJD SR No. 431/2011 Coll. as amended	**Decree of the ÚJD SR No. 431/2011 Coll.** on a quality management system as amended by Decree No. 104/2016 Coll., Decree No. 154/2022 Coll. (consolidated version) and Decree No. 204/2025 Coll. **Published: 30 November 2011** **Time version of the regulation effective from: 01 January 2026**
Decree of the ÚJD SR No. 30/2012 Coll. as amended	**Decree of the ÚJD SR No. 30/2012 Coll.** as amended by Decree No. 101/2016 Coll. laying down details of requirements for the handling of nuclear materials, radioactive waste and spent nuclear fuel (consolidated version) **Published: 03 February 2012** **Time version of the regulation effective from: 01 March 2016**
Decree of the ÚJD SR No. 33/2012 Coll. as amended	**Decree of the ÚJD SR No. 33/2012 Coll.** as amended by Decree No. 106/2016 Coll. and Decree No. 71/2019 Coll. on the regular, comprehensive and systematic evaluation of the nuclear safety of nuclear installations (consolidated version) **Published: 03 February 2012** **Time version of the regulation effective from: 15 March 2019**
Decree of the ÚJD SR No. 112/2020 Coll.	**Decree of the ÚJD SR No. 112/2020 Coll.** laying down the special materials and equipment falling under the supervision of the Nuclear Regulatory Authority of the Slovak Republic (consolidated version) **Published: 07 May 2020** **Time version of the regulation effective from: 15 May 2020**
Act No. 87/2018 Coll. as amended	Act No. 87 of 13 March 2018 on **radiation protection** and on amendment and supplementation of certain acts.

Slovenia

Benchmarking of implementation of the Disposal SRLs in the Slovenian framework was initiated at WENRA WGWD meeting 40, and supplemented during WGWD meeting 43, and the result is reflected in the table below.

Since then, the legislation in Slovenia has been amended several times and, as a consequence, the article numbers have also changed but the factual contents have not. The references to the framework in the table below reflects those developments.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	ZVISJV-1 Articles 4, 103, 109122, 123. JV5 Article 37.
DI-02	A	ZVISJV-1 Articles 90, 93, 103, 111. JV5 Article 63. JV9 Articles 5, 15 and 18
DI-03	A	ZVISJV-1 Article 90. JV5 Articles 43, 53. JV9 Ch. II.2 Articles 6-13.
DI-04	A	JV5 Article 63
DI-05	A	ZVISJV-1 Article 91. JV5 Article 64
DI-06	A	ZVISJV-1 Articles 103, 109, 122, 123.
DI-07	A	JV5 Article 53
DI-08	A	JV7 Article 15
DI-09	A	JV5 Article 56
DI-10	A	ZVISJV-1 Article 92. JV5 Articles 65, 56, 67.
DI-11	A	ZVISJV-1 Article 92. JV4 Article 3. JV5 Article 65.
DI-12	A	JV4 Articles 3, 5. JV5 Article 65. JV9 Article 47.
DI-13	A	JV5 Article 53, 67.
DI-14	A	ZVISJV-1 Article 93. JV5 Articles 53, 69, 66.
DI-15	A	JV5 Article 53.
DI-16	A	JV5 Articles 53, 60.
DI-17	A	JV5 Article 60.
DI-18	A	ZVISJV-1 Article 111. JV9 Articles 5, 47.
DI-19	A	ZVISJV-1 Article 90. JV9 Article 7.
DI-20	A	JV5 Articles 12, 18, 19, 37, 43, 60. Annex 5, Chapter 3 item 4
DI-21	A	JV5 Article 37.
DI-22	A	ZVISJV-1 Article 4. JV5 Articles 3, 4.
DI-23	A	JV5 Articles 3, 4.
DI-24	A	JV5 Article 6.
DI-25	A	ZVISJV-1 Articles 4, 60.
DI-26	A	JV5 Article 7, Annex 5, Chapters 1, 5 and 6.
DI-27	A	JV5 Articles 4, 7, Annex 5, Chapter 1 item 7.
DI-28	A	JV5 Annex 5, Chapter 3.
DI-29	A	JV5 Annex 5, Chapter 3 item 2.
DI-30	A	JV5 Article 51, Annex 5.
DI-31	A	JV5 Annex 5.
DI-32	A	ZVISJV-1 Articles 905, 97, 101. JV5 Annex 5, Chapter 1 item 3.
DI-33	A	ZVISJV-1, Article 95. JV5 Articles 2, 10, Annex 5, Chapter 1 item 3, Chapter 3 item 2. JV10 Article 21.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-34	A	JV5, Annex 5
DI-35	A	JV5 Articles 4, 10, 11.
DI-36	A	JV5 Article 10, Annex 5
DI-37	A	JV5 Annex 5
DI-38	A	JV5 Articles 2, 4, 7.
DI-39	A	JV5 Annexes 1, 5
DI-40	A	JV5 Articles 3, 4, 43, 63.
DI-41	A	JV5 Annex 5, Chapter 3 item 5.
DI-42	A	JV5 Annex 5.
DI-43	A	JV5 Article 4. JV9 Articles 14, 18.
DI-44	A	ZVISJV-1 Article 159. JV5, Annex 5. JV10 Article 21.
DI-45	A	JV5 Articles 6.
DI-46	A	JV5 Article 8, Annexes 3, 5.
DI-47	A	ZVISJV-1 Article 95. JV5 Annex 5 Chapters 1 item 3. JV10 Article 21.
DI-48	A	ZVISJV-1 Articles 158, 159. JV10 Article 21.
DI-49	A	JV10 Article 26. JV5 Annex 5.
DI-50	A	Building Act, Chapter II. ZVISJV-1 Article 97. JV5 Articles 3, 25, 42, 60.
DI-51	A	Building Act, Chapter II. ZVISJV-1 Article 97. JV5 Article 25.
DI-52	A	JV5 Annex 5.
DI-53	A	ZVISJV-1 Article 116. JV9 Articles 39, 40.
DI-54	A	ZVISJV-1 Articles 42, 87,111.
DI-55	A	JV9 Article 67.
DI-56	A	JV5 Annex 5.
DI-57	A	JV5 Articles 47, 48.
DI-58	A	JV5 Articles 25, 27.
DI-59	A	JV5 Articles 25, 27.
DI-60	A	JV9 Article 40.
DI-61	A	ZVISJV-1 Article 116. JV9 Articles 39, 40.
DI-62	A	ZVISJV-1 Article 130. JV9 Article 67.
DI-63	A	JV9 Articles 67, 68, 69.
DI-64	A	JV9 Article 71. JV5 Article 26. NERP Annex D-2.
DI-65	A	JV9 Articles 5, 17. JV5 Article 44.
DI-66	A	JV9 Articles 17, 18.
DI-67	A	JV9 Article 18.
DI-68	A	JV5 Articles 37, 44.
DI-69	A	JV5 Articles 33, 35, 36, 50. JV7 Article 6.
DI-70	A	ZVISJV-1 Articles 103, 109.
DI-71	A	ZVISJV-1 Articles 32, 36, 50, 109, 110, 116, 123.
DI-72	A	ZVISJV-1 Articles 103, 123, 165. JV5 Article 37.
DI-73	A	ZVISJV-1 Articles 125, 167. JV5 Article 37. UV3 Chapters II and III.
DI-74	A	JV7 Article 20.
DI-75	A	JV7 Articles 19, 20.
DI-76	A	JV7 Article 20.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-77	A	JV7 Article 20.
DI-78	A	ZVISJV-1 Articles 116. JV7 Article 20.
DI-79	A	JV7 Articles 9, 10, 15, 19, 20. JV5 Articles 8, 67.
DI-80	A	JV7 Articles 9, 10.
DI-81	A	JV7 Articles 15. JV5 Articles 8, 67.
DI-82	A	JV5 Annexes 3, 5. JV7 Articles 19.
DI-83	A	JV5 Article 43.
DI-84	A	ZVISJV-1 Article 103. JV5 Article 44, Annex 5.
DI-85	A	JV5 Article 44.
DI-86	A	ZVISJV-1 Article 103. JV5 Articles 16, 44.
DI-87	A	JV5 Article 44.
DI-88	A	JV5 Article 16.
DI-89	A	JV5 Article 43.
DI-90	A	JV5 Article 43.
DI-91	A	JV5 Articles 4, 44.
DI-92	A	JV5 Articles 16, 47, 49.
DI-93	A	ZVISJV-1 Article 4. JV5 Annex 5.
DI-94	A	ZVISJV-1 Article 103. JV5 Articles 43, 44.
DI-95	A	JV5 Articles 44, 53.
DI-96	A	JV5 Article 43. PS1.03 7.2.3.
DI-97	A	JV5 Article 43.
DI-98	A	ZVISJV-1 Articles 114, 116. JV5 Article 43.
DI-99	A	JV5 Articles 43, ZVISJV-1 Article 119.
DI-100	A	ZVISJV-1 Article 101. JV5 Annex 1.
DI-101	A	JV5 Articles 2, 10, 11.
DI-102	A	JV5 Articles 2, 3, 4.
DI-103	A	JV5 Article 16.
DI-104	A	JV5 Articles 2, 7.
DI-105	A	PS1.03 7.1.1.
DI-106	A	ZVISJV-1 Article 112. JV9 Article 53.
DI-107	A	JV9 Articles 52, 53, Annex 10.
DI-108	A	ZVISJV-1 Article 112, 114. JV9 Articles 53, 55.

References

ZVISJV-1	Act on Protection Against Ionizing Radiation and Nuclear Safety (Official Gazette RS, Nos. 76/17, 26/19, 172/21 and 18/23-ZDU-1O)
JV4	Rules on providing qualification for workers in radiation and nuclear facilities (Official Gazette RS, No. 162/20)
JV5	Rules on radiation and nuclear safety factors (Official Gazette RS, No. 56/24)
JV7	Regulation on radioactive waste and spent fuel management (Official Gazette RS, Nos. 125/21 and 74/24)
JV9	Rules on the safety assurance of radiation and nuclear facilities (Official Gazette RS, No. 27/24)
JV10	Rules on radioactivity monitoring (Official Gazette RS, No. 27/18)

	Building Act (Official Gazette RS, Nos. 199/21, 105/22 – ZZNŠPP, 133/23, 85/24 – ZAID-A, 47/25 – odl. US and 75/25)
NERP	National Emergency Response Plan for Nuclear and Radiological Accidents, version 4.0., 2023
UV3	Decree on areas of limited use of space due to a nuclear facility and the conditions of facility construction in these areas (Official Gazette RS, No. 78/19)
PS1.03	Guidance on the safety case for disposal of radioactive waste (license conditions and as such enforceable.)

Spain

Benchmarking of implementation of the Disposal SRLs in the Spanish framework was initiated at WENRA WGWD meeting 39 (2017) and concluded at WENRA WGWD meeting 40 (2018), and the result is reflected in the table below. With the references of the Spanish regulatory framework used for the benchmarking, only 24 out of 108 SRLS were rated as A. The main regulations applied in the exercise were the royal decrees on nuclear and radioactive facilities (RD 1836/1999), on the responsible and safe management of spent fuel and radioactive waste (RD 102/2014), on health protection against the derived risk off the exposition to ionizing radiations (RD 1029/2022), and on the following CSN (Nuclear Safety Council) Instructions: on the requirements of the nuclear facilities management system (CSN IS 19), on regulating the filing ad periods of retention of the documents and records of nuclear facilities (CSN IS 24), and on the basic nuclear safety requirements applicable to nuclear installations (CSN IS 26).

The Spanish National Action Plan to comply with the remaining SRLs rated as C is based on putting on force a CSN (Nuclear Safety Council) Instruction that will cover the safe disposal of spent fuel and radioactive waste.

# SRL	Current status	Actions taken / relevant regulations
DI-01	A	Royal Decree 1836/1999. Royal Decree 102/2014
DI-02	A	Royal Decree 102/2014. CSN Instruction IS-19
DI-03	A	Royal Decree 1836/1999. Royal Decree 102/2014
DI-04	A	Royal Decree 1836/1999. CSN Instruction IS-19
DI-05	A	Royal Decree 1836/1999
DI-06	C	NAP: CSN Instruction
DI-07	A	Royal Decree 1836/1999. Royal Decree 102/2014. CSN Instruction IS-19
DI-08	A	Royal Decree 102/2014
DI-09	A	Royal Decree 1836/1999
DI-10	A	Royal Decree 1836/1999
DI-11	A	Royal Decree 1836/1999. CSN Instruction IS-19
DI-12	A	Royal Decree 1836/1999. CSN Instruction IS-19
DI-13	A	Royal Decree 1836/1999. CSN Instruction IS-19
DI-14	A	Royal Decree 1836/1999. Royal Decree 102/2014. CSN Instruction IS-19
DI-15	A	Royal Decree 1836/1999
DI-16	C	NAP: CSN Instruction
DI-17	A	Royal Decree 1836/1999. CSN Instruction IS-19
DI-18	A	CSN Instruction IS-19

# SRL	Current status	Actions taken / relevant regulations
DI-19	C	NAP: CSN Instruction
DI-20	C	NAP: CSN Instruction
DI-21	C	NAP: CSN Instruction
DI-22	A	Royal Decree 1836/1999. Royal Decree 102/2014. CSN Instruction IS-19
DI-23	C	NAP: CSN Instruction
DI-24	C	NAP: CSN Instruction
DI-25	C	NAP: CSN Instruction
DI-26	C	NAP: CSN Instruction
DI-27	C	NAP: CSN Instruction
DI-28	C	NAP: CSN Instruction
DI-29	C	NAP: CSN Instruction
DI-30	C	NAP: CSN Instruction
DI-31	C	NAP: CSN Instruction
DI-32	C	NAP: CSN Instruction
DI-33	C	NAP: CSN Instruction
DI-34	C	NAP: CSN Instruction
DI-35	C	NAP: CSN Instruction
DI-36	C	NAP: CSN Instruction
DI-37	C	NAP: CSN Instruction
DI-38	C	NAP: CSN Instruction
DI-39	C	NAP: CSN Instruction
DI-40	C	NAP: CSN Instruction
DI-41	C	NAP: CSN Instruction
DI-42	C	NAP: CSN Instruction
DI-43	C	NAP: CSN Instruction
DI-44	C	NAP: CSN Instruction
DI-45	A	Royal Decree 102/2014
DI-46	C	NAP: CSN Instruction
DI-47	A	Royal Decree 1836/1999
DI-48	C	NAP: CSN Instruction
DI-49	C	NAP: CSN Instruction
DI-50	C	NAP: CSN Instruction
DI-51	C	NAP: CSN Instruction
DI-52	C	NAP: CSN Instruction
DI-53	C	NAP: CSN Instruction
DI-54	C	NAP: CSN Instruction
DI-55	C	NAP: CSN Instruction
DI-56	C	NAP: CSN Instruction
DI-57	C	NAP: CSN Instruction
DI-58	A	Royal Decree 1836/1999
DI-59	C	NAP: CSN Instruction
DI-60	C	NAP: CSN Instruction
DI-61	C	NAP: CSN Instruction

# SRL	Current status	Actions taken / relevant regulations
DI-62	A	Royal Decree 1836/1999
DI-63	A	Royal Decree 1836/1999
DI-64	A	Royal Decree 1836/1999
DI-65	C	NAP: CSN Instruction
DI-66	C	NAP: CSN Instruction
DI-67	C	NAP: CSN Instruction
DI-68	C	NAP: CSN Instruction
DI-69	C	NAP: CSN Instruction
DI-70	C	NAP: CSN Instruction
DI-71	A	Royal Decree 1836/1999
DI-72	C	NAP: CSN Instruction
DI-73	C	NAP: CSN Instruction
DI-74	C	NAP: CSN Instruction
DI-75	C	NAP: CSN Instruction
DI-76	C	NAP: CSN Instruction
DI-77	C	NAP: CSN Instruction
DI-78	C	NAP: CSN Instruction
DI-79	C	NAP: CSN Instruction
DI-80	C	NAP: CSN Instruction
DI-81	C	NAP: CSN Instruction
DI-82	C	NAP: CSN Instruction
DI-83	C	NAP: CSN Instruction
DI-84	C	NAP: CSN Instruction
DI-85	C	NAP: CSN Instruction
DI-86	C	NAP: CSN Instruction
DI-87	C	NAP: CSN Instruction
DI-88	C	NAP: CSN Instruction
DI-89	C	NAP: CSN Instruction
DI-90	C	NAP: CSN Instruction
DI-91	C	NAP: CSN Instruction
DI-92	C	NAP: CSN Instruction
DI-93	C	NAP: CSN Instruction
DI-94	C	NAP: CSN Instruction
DI-95	C	NAP: CSN Instruction
DI-96	C	NAP: CSN Instruction
DI-97	C	NAP: CSN Instruction
DI-98	C	NAP: CSN Instruction
DI-99	C	NAP: CSN Instruction
DI-100	C	NAP: CSN Instruction
DI-101	C	NAP: CSN Instruction
DI-102	C	NAP: CSN Instruction
DI-103	C	NAP: CSN Instruction
DI-104	C	NAP: CSN Instruction

# SRL	Current status	Actions taken / relevant regulations
DI-105	C	NAP: CSN Instruction
DI-106	C	NAP: CSN Instruction
DI-107	C	NAP: CSN Instruction
DI-108	C	NAP: CSN Instruction

References:

1.	Royal Decree 1836/1999 Regulation on nuclear and radioactive facilities
2.	Royal Decree 102/2014 On the responsible and safe management of spent fuel and radioactive waste
3.	Royal Decree 738/2001 Regulation on Health Protection against Ionising Radiations
4.	CSN Instruction IS-19 On the requirements of the nuclear facilities management system
5.	CSN Instruction IS-24 Regulating the filing and periods of retention of the documents and records of nuclear facilities
6.	CSN Instruction IS-26 On basic nuclear safety requirements applicable to nuclear installations.

Sweden

Benchmarking of implementation of the Disposal SRLs in the Swedish framework was performed during WGWD meeting 39 and the result is reflected in the table below.

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	Act on Nuclear Activities (1984:3), Sections 10 and 14
DI-02	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 10
DI-03	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 9, item 7 SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 3
DI-04	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 8 and 9, item 1
DI-05	A	Act on Nuclear Activities, (1984:3) Section 13 SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 7
DI-06	A	Act on Nuclear Activities (1984:3), Section 10 SSMFS 2008:21, Section 1
DI-07	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 8 and 8a
DI-08	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 8 and 9, item 2
DI-09	A	Act on Nuclear Activities, (1984:3) Section 13 SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Sections 7 and 9, items 1 and 2
DI-10	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 9, items 5,6, 7 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-11	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 9, item 5
DI-12	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 9, item 5
DI-13	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 9, item 5
DI-14	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 8 and 9
DI-15	A	SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 2
DI-16	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 8 and 9
DI-17	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 7, 8, 8a, 9 SSMFS 2008:1, Chapter 8 (Documentation & retention), Sections 1, 2 SSMFS 2008:38, (Filing at nuclear facilities), Section 2

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-18	A	SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 2, 3a
DI-19	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 9, items 7, 8
DI-20	A	SSMFS 2008:1, Chapter 6 (Nuclear material and waste), Sections 10 SSMFS 2008:1, Chapter 8 (Documentation & retention), Sections 1, 2 SSMFS 2008:21, (Disposal of nuclear waste), Section 4
DI-21	A	SSMFS 2008:38, (Filing at nuclear facilities), Section 2, 3, 4
DI-22	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Sections 1, 7 SSMFS 2008:51, (Radiation protection) Chapter 2, Section 1
DI-23	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions), Section 1 SSMFS 2008:21, (Disposal of nuclear waste), Sections 2 and 3
DI-24	A	SSMFS 2008:21, (Disposal of nuclear waste), Sections 2
DI-25	A	SSMFS 2008:37, Protection in connection with disposal), Section 4
DI-26	A	SSMFS 2008:1, Chapter 3 (Facility design) Section 4 SSMFS 2008:21, (Disposal of nuclear waste), Sections 1, 2, 3
DI-27	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 1 SSMFS 2008:21, (Disposal of nuclear waste), Sections 5, 5, 10
DI-28	A	SSMFS 2008:21, (Disposal of nuclear waste), Section 8
DI-29	A	Act on Nuclear Activities, (1984:3) Section 10 SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 10 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2 SSMFS 2008:21, (Disposal of nuclear waste), Section 1, 11
DI-30	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2 and 5 SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 1 and 2
DI-31	A	SSMFS 2008:21, (Disposal of nuclear waste), Section 8
DI-32	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 10 SSMFS 2008:1, Chapter 4 (Assessment of safety) Sections 1, 2 SSMFS 2008:21, (Disposal of nuclear waste), Section 9
DI-33	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 10 SSMFS 2008:21, (Disposal of nuclear waste), Sections 9, 11
DI-34	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 1 SSMFS 2008:1, Chapter 3 (Facility design) Section 2 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2 SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Section 2 SSMFS 2008:21, (Disposal of nuclear waste), Section 5
DI-35	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 1 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2 SSMFS 2008:21, (Disposal of nuclear waste), Sections 5, 9
DI-36	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 1 SSMFS 2008:21, (Disposal of nuclear waste), Sections 5, 9
DI-37	A	SSMFS 2008:1, Chapter 1 (Application and definitions) Section 1 SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 3 SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 4 SSMFS 2008:21, (Disposal of nuclear waste), Sections 5, 7
DI-38	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Sections 1, 8 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-39	A	SSMFS 2008:1, Chapter 3 (Facility design) Section 4 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-40	A	SSMFS 2008:1, Chapter 3 (Facility design) Section 2 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2 SSMFS 2008:21, (Disposal of nuclear waste), Section 6

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-41	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 4
DI-42	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 1 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2 SSMFS 2008:21, (Disposal of nuclear waste), Sections 5, 9
DI-43	A	SSMFS 2008:1, Chapter 3 (Facility design) Section 4 SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 3
DI-44	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 10 SSMFS 2008:1, Chapter 3 (Facility design) Section 4 SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 3 SSMFS 2008:21, (Disposal of nuclear waste), Section 4
DI-45	A	SSMFS 2008:1, Chapter 3 (Facility design) Sections 1, 4 SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Section 2
DI-46	A	SSMFS 2008:1, Chapter 3 (Facility design) Section 2 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-47	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 10 SSMFS 2008:23, (Discharges from nuclear facilities), Sections 7, 11
DI-48	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 10 SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 3
DI-49	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 8 SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 3 SSMFS 2008:1, Chapter 8 (Documentation & retention), Section 2
DI-50	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-51	A	SSMFS 2008:21, (Disposal of nuclear waste), Sections 2, 3, 5, 6, 7
DI-52	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 10 SSMFS 2008:21, (Disposal of nuclear waste), Section 1
DI-53	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Sections 2, 5 SSMFS 2008:21, (Disposal of nuclear waste), Section 1
DI-54	A	SSMFS 2008:1, Chapter 5 (Operation of the facility) Sections 1, 2
DI-55	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 3 SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 3 SSMFS 2008:21, (Disposal of nuclear waste), Sections 4, 8
DI-56	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 10 SSMFS 2008:1, Chapter 5 (Operation of the facility) Sections 5, 3 SSMFS 2008:21, (Disposal of nuclear waste), Section 1
DI-57	A	SSMFS 2008:1, Chapter 5 (Operation of the facility) Sections 1, 2
DI-58	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2 SSMFS 2008:1, Chapter 5 (Operation of the facility) Sections 3a, 3b
DI-59	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2, SSMFS 2008:1, Chapter 9 (Decommissioning) Section 1 SSMFS 2008:21, (Disposal of nuclear waste), Section 11
DI-60	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Sections 2, 5
DI-61	A	SSMFS 2008:1, Chapter 3 (Facility design) Section 1 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 5
DI-62	A	SSMFS 2014:2 (Emergency preparedness) Chapter 2, Sections 2, 4
DI-63	A	SSMFS 2014:2 (Emergency preparedness) Chapter 2, Sections 1, 2, 5
DI-64	A	SSMFS 2014:2 (Emergency preparedness) Chapter 2, Sections 2, 3 SSMFS 2014:2 (Emergency preparedness) Chapter 10, Sections 2, 4
DI-65	A	SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 3 SSMFS 2008:21, (Disposal of nuclear waste), Section 1

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-66	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 9 SSMFS 2008:1, Chapter 8 (Documentation & retention), Sections 1, 2
DI-67	A	SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 3
DI-68	A	SSMFS 2008:1, Chapter 2 (Basic Safety Provisions) Section 8 SSMFS 2008:21, (Disposal of nuclear waste), Section 2
DI-69	A	SSMFS 2008:1, Chapter 9 (Decommissioning) Sections 1, 3, 7, 10
DI-70	A	SSMFS 2008:1, Chapter 5 (Operation of the facility) Section 2 SSMFS 2008:1, Chapter 9 (Decommissioning) Section 7 SSMFS 2008:21, (Disposal of nuclear waste), Section 11
DI-71	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Sections 2, 5 SSMFS 2008:21, (Disposal of nuclear waste), Section 11
DI-72	A	SSMFS 2008:21, (Disposal of nuclear waste), Sections 1, 4
DI-73	A	Act on Nuclear Activities (1984:3), Sections 10 and 14 SSMFS 2008:1, Chapter 9 (Decommissioning) Section 1
DI-74	A	SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Section 11
DI-75	A	SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Sections 11, 12
DI-76	A	SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Sections 9, 10
DI-77	A	SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Section 11
DI-78	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Sections 2, 5 SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Section 11
DI-79	A	SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Section 12
DI-80	A	SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Section 10
DI-81	A	SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Section 12
DI-82	A	SSMFS 2008:1, Chapter 6 (Nuclear material and waste) Section 12
DI-83	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-84	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2 SSMFS 2008:21, (Disposal of nuclear waste), Section 11
DI-85	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 1 SSMFS 2008:21, (Disposal of nuclear waste), Section 9
DI-86	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 1 SSMFS 2008:21, (Disposal of nuclear waste), Section 9, 11
DI-87	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-88	A	SSMFS 2008:21, (Disposal of nuclear waste), Section 9
DI-89	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-90	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-91	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2 SSMFS 2008:21, (Disposal of nuclear waste), Section 9
DI-92	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Sections 1, 2 SSMFS 2008:21, (Disposal of nuclear waste), Section 9
DI-93	A	SSMFS 2008:37, (Protection in connection with disposal), Section 4
DI-94	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Sections 1, 2 SSMFS 2008:1, Chapter 9 (Decommissioning) Section 7 SSMFS 2008:21, (Disposal of nuclear waste), Section 11
DI-95	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Sections 7, 8 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-96	A	SSMFS 2008:21, (Disposal of nuclear waste), Sections 9, 11
DI-97	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Sections 2, 4, 5 SSMFS 2008:21, (Disposal of nuclear waste), Section 11

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-98	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2 SSMFS 2008:21, (Disposal of nuclear waste), Section 11
DI-99	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Sections 1, 2, 5
DI-100	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 1 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-101	A	SSMFS 2008:21, (Disposal of nuclear waste), Sections 9, 11
DI-102	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 1 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 1 SSMFS 2008:21, (Disposal of nuclear waste), Section 11
DI-103	A	SSMFS 2008:21, (Disposal of nuclear waste), Section 10 SSMFS 2008:37, (Protection in connection with disposal), Section 10
DI-104	A	SSMFS 2008:1, Chapter 2 (Basic safety provisions) Section 1 SSMFS 2008:21, (Disposal of nuclear waste), Section 9
DI-105	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 2
DI-106	A	Act on Nuclear Activities (1984:3), Section 10 SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 4
DI-107	A	SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 4
DI-108	A	Act on Nuclear Activities (1984:3), Section 10a SSMFS 2008:1, Chapter 4 (Assessment of safety) Section 4

References

SFS 1984:3	Act on Nuclear Activities
SSMFS 2008:1	The Swedish Radiation Safety Authority's Regulations and General Advice concerning Safety in Nuclear Facilities (SSMFS 2008:1)
SSMFS 2008:21	The Swedish Radiation Safety Authority's regulations and general advice concerning safety in connection with the disposal of nuclear material and nuclear waste SSMFS 2008:21
SSMFS 2008:23	The Swedish Radiation Safety Authority's Regulations on Protection of Human Health and the Environment in connection with Discharges of Radioactive Substances from certain Nuclear Facilities (SSMFS 2008:23)
SSMFS 2008:37	The Swedish Radiation Safety Authority's Regulations and General Advice Concerning the Protection of Human Health and the Environment in Connection with the Final Management of Spent Nuclear Fuel and Nuclear Waste (SSMFS 2008:37)
SSMFS 2008:38	The Swedish Radiation Safety Authority's Regulations and General Advice concerning archiving at nuclear facilities (SSMFS 2008:38)
SSMFS 2008:51	The Swedish Radiation Safety Authority's regulations concerning basic provisions for the protection of workers and the general public in practices involving ionising radiation
SSMFS 2014:2	The Swedish Radiation Safety Authority's Regulations and General Advice concerning emergency preparedness at nuclear facilities.

Switzerland

Benchmarking of implementation of the Disposal SRLs in the Swiss framework was discussed at the 37th WENRA WGWD Meeting in autumn 2016 and the results are reflected in the table below.

The main regulations for compliance with the Disposal SRLs are outlined in the table below and mainly consist of the Nuclear Energy Act, the Nuclear Energy Ordinance and the Guideline ENSI-G03 Deep Geological Repositories. The remaining Cs were subsequently addressed through the revision of ENSI-G03 Guideline (2020) and the ENSI-G17 Guideline for decommissioning. The process for developing regulatory ENSI-Guidelines in Switzerland includes a step in which compliance with IAEA requirements and the WENRA SRLs is assessed. The specific regulatory framework through which compliance with the Disposal SRLs is achieved in Switzerland is detailed in the explanatory report of the ENSI-G03 Guideline, which is publicly accessible online (https://ensi.admin.ch/en/wp-content/uploads/sites/5/2021/11/ENSI-G03_E_Edition_2020-12_Explanatory_Report_Amendment_2025-05-12.pdf).

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-01	A	NEA Articles 22 (1), 39 (1),(2), G03:Article 5.3.1
DI-02	A	NEA Articles 22 (1), (2)
DI-03	A	NEA Articles 22 (2)
DI-04	A	NEA Articles 5 (1), 22 (2), 34 (b)
DI-05	A	NEA Articles 22 (1), (2), NEO Article 30 (1), (2)
DI-06	A	NEA Articles 21 (1), (3), (4) 22 (2), 34 (b),
DI-07	A	NEO Article 30 (1)
DI-08	A	ENSI G03: 5.2.4
DI-09	A	NEA Article 22 (2), NEO Articles 30 (1), (2), 31
DI-10	A	NEA Article 22 (2), NEO Articles 30 (1), (2), 31
DI-11	A	NEA Article 22 (2), NEO Articles 30 (1), (2), (4), 31
DI-12	A	NEO Articles 30 (1), (2), 31
DI-13	A	NEO Article 30 (1)
DI-14	C	NEO Articles 30 (1), (2), (3), (4), (5), 31, ENSI G07: 4.4
DI-15	A	NEO Article 30 (1)
DI-16	A	NEO Article 16 (1)
DI-17	A	ENSI G07: 4.2
DI-18	A	NEO Articles 25 (1), 31
DI-19	A	NEO Article 36 (3), ENSI G07: 7.7
DI-20	A	NEA Articles 22 (2), 38 (2), NEO Articles 37 (1), 41 (1), (2), (3), (4), 54 (3), 71 (1), (2), (3), 72 (1), Annex 4
DI-21	A	NEO Articles 71 (1), (2)
DI-22	A	RPA Articles 8, 9, 10, 11, RPO Articles 5 (1), 6 (1), (3), NEA Articles 1, 2, 3, 4, ENSI G03: 6.2
DI-23	A	NEO Articles 10 (1), 11(2)
DI-24	A	NEO Article 11(2)
DI-25	A	RPA Articles 8, 9, 10, 11, RPA Articles 5 (1), 6 (1), (3), NEA Articles 1, 2, 3, 4, ENSI G03: 4.2, 6.1, 6.2
DI-26	A	NEA Article 39 (2), NEO Article 11 (2), ENSI G03: 4.2, 7.2.2
DI-27	A	NEA Article 39 (2), NEO Article 11 (2), ENSI G03: 4.2, 7.2.2
DI-28	A	NEO Article 11 (2)
DI-29	A	OFCS 2013, NEA Art 32, NEO Art 52, ENSI G03: 7.2.1

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-30	C	-
DI-31	A	ENSI G03: 5.1.7
DI-32	A	OFCS 2013, NEA Art 32, NEO Art 5, 52, ENSI G03: 7.2.1
DI-33	A	OFCS 2013, NEA Art 32, 35 (1), 65 (1), 66 (1), NEO Art 52, ENSI G03: 5.2.1, 5.2.2, 7.1, 7.2.1
DI-34	A	NEA Article 37 (2), NEO Article 7, 23, 30:4, ENSI G03: 5.1.1, 5.1.3
DI-35	A	NEO Article 8 (1), (2), (3), (4), (5), (6)
DI-36	A	ENSI G03: 7.2.2
DI-37	A	ENSI G03: 6.1
DI-38	A	NEA Article 16 (1), 20 (1), NEO Article 11 (2), ENSI G03: 4.1, 4.2, 5.1.1, 5.1.3, 5.1.4, 6.1
DI-39	A	NEO Article 24 (2), Annex 4
DI-40	A	NEA Articles 16 (1), 20 (1), 22 (1), (2), NEO Article 7
DI-41	C	-
DI-42	A	ENSI G03: 5.1.3
DI-43	A	NEO Article 24 (2), 35 (1) Annex 3, Annex 4
DI-44	A	NEO Article 66 (1), ENSI G03: 5.1.1, 5.1.3, 5.2.1
DI-45	A	NEO Article 10 (1)
DI-46	A	NEO Article 27 (1), 32 (1), (2), (3), (4), ENSI G03: 5.1, 5.1.1
DI-47	A	ENSI G03: 5.2.1
DI-48	A	NEO Article 66 (1), 68 (1), (2)
DI-49	A	NEA Article 38 (2), 39 (1), (2), (3), (4), ENSI G03: 5.2.1, 5.2.2, 7.2.2
DI-50	A	NEA Article 16 (2), 18), NEO Articles 7, 65 (2), ENSI G03: 5.1
DI-51	A	NEA Article 35 (2), NEO Article 67 (2)
DI-52	A	ENSI G03: 5.2.1, 5.2.2
DI-53	A	NEO Articles 26 (1), (2), (3), 40 (1), (2),
DI-54	A	NEA Article 20 (1), ENSI G03: 5.2.1, 5.2.2, 5.2.3, 5.2.5
DI-55	A	NEO Articles 8 (1), ENSI G03: 5.13, 5.17, 7.1
DI-56	A	ENSI G03: 5.2.1, 5.2.2
DI-57	C	-
DI-58	A	NEO Article 29 (1), (2)
DI-59	C	-
DI-60	A	NEO Article 27 (3), 40 (1), (2) Annex 3, Annex 4
DI-61	A	NEO Article 27 (3), 40 (1), (2) Annex 3, Annex 4
DI-62	A	NEA Article 5 (2), NEO Articles 7, 8 (1), 30 (1), RPO Article 97 (1), (2), ENSI B12: 4.1, 4.3
DI-63	A	NEA Article 20 (1), ENSI G07, ENSI B11, ENSI B12
DI-64	A	ENSI B11
DI-65	A	NEA Article 22 (1), (2), NEO Article 32 (1)
DI-66	A	NEO Articles 33 (1), (2) ENSI G03: 6.2
DI-67	A	NEO Articles 33 (1), (2) ENSI G03: 6.2
DI-68	A	NEA Article 39 (2), NEO Articles 37 (2), 69 (3), ENSI G03: 5.3.1
DI-69	C	NEA Article 13 (1), NEO Articles 67 (1), (2), 68 (1), ENSI G03: 5.1, 5.2, 6.3
DI-70	A	NEA Article 13 (1), 22 (1), (2), 26 (2) NEO Articles 69 (2), ENSI G03: 5.1.3

# SRL	Current status	Referenced legislation or regulation / Actions taken
DI-71	A	NEO Articles 26 (1), (2), (3), 40 (1), (2)
DI-72	B	NEA Articles 39 (3), (4)
DI-73	A	NEA Articles 40 (1), (2), (3), (4), (5), (6), (7), NEO Articles 66 (1), 70 (1), (2), (3), (4), ENSI G03: 7.2.1
DI-74	A	NEO Articles 54 (2), (4), (5), (6)
DI-75	A	NEA Articles 37 (3), ENSI G03: 7.2
DI-76	A	NEA Articles 37 (3)
DI-77	A	NEA Articles 37 (3), ENSI B05: 4.2.1
DI-78	A	ENSI G03: 7.2
DI-79	A	ENSI G03: 5.2.4
DI-80	A	ENSI G03: 6.3
DI-81	A	ENSI B05: 4.2.1
DI-82	A	ENSI G03: 5.2.4
DI-83	A	NEO Articles 33 (1), (2) ENSI G03: 7.1, 7.2, ENSI G09
DI-84	A	NEO Articles 33 (1), (2) ENSI G03: 7.1, 7.2, ENSI G09
DI-85	A	NEO Articles 33 (1), (2) ENSI G03: 7.1, 7.2, ENSI G09
DI-86	A	ENSI G03: 7.1, 7.2
DI-87	A	NEO Articles 33 (1), (2) ENSI G03: 7.1, 7.2
DI-88	A	NEA Articles 40 (2), (7), NEO 70 (4), ENSI G03: 9.3.4
DI-89	A	ENSI G03: 7.1, 7.2
DI-90	A	ENSI G03: 7.1, 7.2
DI-91	A	NEO Articles 33 (1), (2) ENSI G03: 7.1, 7.2, ENSI G09
DI-92	A	ENSI G03: 7.2
DI-93	A	ENSI G03: 6.1
DI-94	A	NEA Article 22 (2), NEO Article 42 (1), ENSI G03: 7.2
DI-95	B	ENSI G07
DI-96	A	ENSI G07: 4.2, ENSI G03: 7.2.1
DI-97	A	ENSI G03: 7
DI-98	A	NEO Articles 33 (1), (2) ENSI G03: 7.1, 7.2, ENSI G08, ENSI G09
DI-99	A	NEA Articles 65 (1), (2), (3), (4), (5), NEO Articles 40 (1), (2), (3), (4),
DI-100	A	ENSI G03: 7.1
DI-101	A	ENSI G03: 7.2
DI-102	A	NEO Article 11 (2)
DI-103	A	ENSI G03: 7.2
DI-104	A	ENSI G03: 5.1, 7.2
DI-105	A	ENSI G03: 7.2
DI-106	A	NEA Article 22 (1), NEO Article 33 (1)
DI-107	C	NEO Article 33 (1), ENSI G03: 5.2.2, 5.2.4, 5.3.1, 7.1, 7.2,
DI-108	A	ENSI G03: 6.3, 7.1

References

NEA	Swiss Nuclear Energy Act: SR 732.1
NEO	Swiss Nuclear Energy Ordinance: SR 732.11

ENSI G03	ENSI Regulatory Guide G03 Deep Geological Repositories
ENSI G07	ENSI Regulatory Guide G07 The Organisation of Nuclear Installations
ENSI G08	ENSI Regulatory Guide G08 Systematic Safety Review of nuclear installations
ENSI G09	ENSI Regulatory Guide G09 Construction and Operational Documentation
ENSI B05	ENSI Regulatory Guide B05 on Conditioning of radioactive waste
ENSI B11	ENSI Regulatory Guide B11 on Emergency preparedness exercises
ENSI B12	ENSI Regulatory Guide B12 on Emergency planning in nuclear installations
RPA	Radiation Protection Act SR 814.50
RPO	Radiation Protection Ordinance SR 814.501
OFCS 2013	Order of the Federal Council of Switzerland from 22. August 2013

Ukraine

The State Nuclear Regulatory Inspectorate of Ukraine (SNRIU) establishes regulatory requirements in the area of nuclear energy use, the part of each are requirements for radioactive waste (RAW) management, including requirements for RAW disposal.

The regulatory system contains a number of documents that regulate RAW disposal.

The main of them are:
- "General Safety Provisions for Disposal of Radioactive Waste", NP 306.4.219-2018;
- "Requirements for Structure and Content of the Safety Analysis Report for Surface and Near-Surface Radioactive Waste Disposal Facilities", NP 306.4.223-2020.

These documents came into force in 2018 and in 2020 respectively and aimed to harmonize the Ukrainian regulations with the European Union requirements and the WENRA safety reference levels.

Also significant documents that regulate RAW management are:
- Law of Ukraine "On Nuclear Energy Use and Radiation Safety" (1995)
- Law of Ukraine "On radioactive waste management" (1995)
- "Safety Conditions and Requirements (Licensing Conditions) for Radioactive Waste Management", NP 306.5.04/2.060-02 (2002):
- "Requirements for Siting of Radioactive Waste Disposal Facility", NP 306.4.149-2008;
- "General Requirements for the Management System in Nuclear Energy Use", NP 306.1.190-2012,
- "Requirements for the Management System for Activities of the Operating Organization (Operator)", NP 306.1.182-2012.

Benchmarking

The SNRIU performed the self-assessment of the Ukrainian regulations in the area of RAW disposal and presented the results of the self-assessment at the sub-group WGWD meeting on March 03-05, 2021 via online meeting.

Results of the benchmarking:
- 107 safety reference levels have mark "A".
- 1 safety reference level has mark "B".

The benchmarking for the disposal SRLs showed that Ukrainian regulatory system is compliant with the SRLs.

The result of the benchmarking was confirmed at the WGWD-45 plenary meeting on March 22-26, 2021 via online meeting.

# SRL	Current status	Relevant regulations
DI-01	A	NP 306.4.219-2018 (II/2, p.1)
DI-02	A	NP 306.1.190-2012 (p.4.8) NP 306.4.219-2018 (VI/6, p.2, p.3)
DI-03	A	NP 306.4.219-2018 (II/2, p.6)
DI-04	A	NP 306.1.190-2012 (p.4.2, p.2.2) NP 306.4.219-2018 (II/6, p.3) NP 306.1.182-2012 (p.2.3)
DI-05	A	NP 306.4.219-2018 (II/2, p.5; II/9, p.3)
DI-06	A	Law of Ukraine "On Nuclear Energy Use and Radiation Safety" (Art.32) NP 306.4.219-2018 (VII/1, p.16; VII/2, p.8, p.5)
DI-07	A	NP 306.4.219-2018 (II/6, p.5) NP 306.5.04/2.060-02 (II, p.2.23) NP 306.4.219-2018 (II/6, p.1, p.2) NP 306.1.190-2012 (II, p.2.2)
DI-08	A	NP 306.4.219-2018 (II/6, p.3) NP 306.1.190-2012 (p.4.8)
DI-09	A	NP 306.1.190-2012 (p.4.7, p.4.2, p.4.8) NP 306.4.219-2018 (II/2, p.5)
DI-10	A	NP 306.4.219-2018 (VI/5, p.1; II/2, p.5)
DI-11	A	NP 306.4.219-2018 (VI/5, p.2)
DI-12	A	NP 306.4.219-2018 (VI/5, p.2, p.3) NP 306.5.04/2.060-02 (II, p.2.3)
DI-13	A	NP 306.4.219-2018 (II/6, p.5) NP 306.1.190-2012 (p.4.12, p.5.2)
DI-14	A	NP 306.1.190-2012 (p.2.1, p.4.8, p.5.2) NP 306.1.190-2012 (p.2.6) NP 306.4.219-2018 (II/7, p.1, p.2) NP 306.1.190-2012 (p.4.8) NP 306.4.219-2018 (VI/6, p.2, p.4)
DI-15	A	NP 306.4.219-2018 (VI/1, p.1; VI/6, p.3)
DI-16	A	NP 306.4.219-2018 (II/6, p.2, p.3) NP 306.1.190-2012 (p.2.1)
DI-17	A	NP 306.1.190-2012 (p.4.3, p.4.2, p.4.7, p.4.8, p.4.8, p.4.12, p.4.8, p.4.11, p.4.1, p.7.4.3, p.7.4.4) NP 306.4.219-2018 (II/7, p.3)
DI-18	A	NP 306.5.04/2.060-02 (p.3.1) NP 306.4.219-2018 (VI/6, p.5, p.2, p.3)
DI-19	A	NP 306.4.219-2018 (II/9, p.1, p.2, p.3)
DI-20	A	NP 306.4.219-2018 (II/2, p.8; VI/4, p.4; VI/6, p.6; VII/1, p.15)
DI-21	A	NP 306.4.219-2018 (VI/4, p.5)
DI-22	A	NP 306.4.219-2018 (II/1, p.2; II/2, p.1, p.2; II/3, p.1)

# SRL	Current status	Relevant regulations
DI-23	A	NP 306.4.219-2018 (II/5, p.1, p.2, p.5) NP 306.4.149-2008 (p.3.9.2)
DI-24	A	NP 306.4.219-2018 (II/5, p.2) NP 306.4.223-2020 (II, p.3) NP 306.4.219-2018 (VII/2, p.5; II/4, p.1, p.2)
DI-25	A	NP 306.4.219-2018 (II/3, p.1, p.3; V, p.6; VI/7, p.4)
DI-26	A	NP 306.4.219-2018 (II/1, p.2; II/4, p.1, p.2; II/5, p.10; VI/1, p.4)
DI-27	A	NP 306.4.219-2018 (IV/2, p.4, p.3; II/11, p.5)
DI-28	B	
DI-29	A	NP 306.4.219-2018 (II/2, p.4; II/11, p.7)
DI-30	A	NP 306.4.219-2018 (V, p.5; VII/1, p.11)
DI-31	A	NP 306.4.219-2018 (IV/1, p.17; VI/4, p.1; IV/3, p.5; II/2, p.1; II/10, p.1, p.3)
DI-32	A	NP 306.4.219-2018 (IV/1, p.1) NP 306.4.149-2008 (VI, p.6.1; p.6.13 (p.6.13.7)
DI-33	A	NP 306.4.149-2008 (p.2 (p.2.6); p.4 (p.4.5, p.4.6, p.4.7, p.4.8, p.4.9, p.4.10, p.4.11); p.6 (p.6.13 (p.6.13.2))
DI-34	A	NP 306.4.219-2018 (II/1, p.4; IV/1, p.10, p.16) NP 306.4.223-2020 (IV/2, p.1, p.2)
DI-35	A	NP 306.4.219-2018 (IV/1, p.2, p.3)
DI-36	A	NP 306.4.219-2018 (IV/1, p.4, p.7)
DI-37	A	NP 306.4.223-2020 (VI/6, p.1) NP 306.4.219-2018 (IV/1, p.10)
DI-38	A	NP 306.4.219-2018 (IV/1, p.9; II/5, p.4; IV/1, p.12, p.9, p.17, p.6, p.13)
DI-39	A	NP 306.4.219-2018 (IV/2, p.1, p.2, p.3, p.4)
DI-40	A	NP 306.4.219-2018 (II/8, p.2, p.1; IV/1, p.7; V, p.1)
DI-41	A	NP 306.5.04/2.060-02 (Annex 3, p.3, p.4) NP 306.1.190-2012 (p.7.7 (p.7.7.1))
DI-42	A	NP 306.4.219-2018 (IV/1, p.5)
DI-43	A	NP 306.4.219-2018 (IV/1, p.9, p.13; VI/12, p.1)
DI-44	A	NP 306.4.219-2018 (IV/1, p.9)
DI-45	A	NP 306.4.223-2020 (II, p.2) NP 306.4.219-2018 (II/5, p.1)
DI-46	A	NP 306.4.219-2018 (IV/1, p.16, p.10)
DI-47	A	NP 306.4.223-2020 (II/11, p.1; III/1, p.10)
DI-48	A	NP 306.4.219-2018 (V, p.6, VI/7, p.3)
DI-49	A	NP 306.4.219-2018 (VI/7, p.1, p.4; V, p.6; VI/4, p.4; VI/7, p.4; VI/4, p.5)
DI-50	A	NP 306.4.219-2018 (V, p.1)
DI-51	A	NP 306.4.219-2018 (V, p.4)
DI-52	A	NP 306.4.219-2018 (V, p.3, p.6)
DI-53	A	NP 306.4.219-2018 (V, p.2, p.6)
DI-54	A	NP 306.5.04/2.060-02 (p.2.6) NP 306.4.219-2018 (VI/6, p.1; II/8, p.2; VI/1, p.2, p.3)
DI-55	A	NP 306.4.219-2018 (VI/10, p.1, p.3, p.2; II/5, p.2)

# SRL	Current status	Relevant regulations
DI-56	A	NP 306.4.219-2018 (V, p.6; VI/4, p.4)
DI-57	A	NP 306.4.219-2018 (VI/1, p.3; VI/6, p.2)
DI-58	A	Law of Ukraine "On Authorizing Activities in Nuclear Energy Use" (Art. 8) NP 306.5.04/2.060-02 (p.2.14, Annex 4) NP 306.4.219-2018 (VI/2, p.1)
DI-59	A	NP 306.4.219-2018 (IV/1, p.3; VII/1, p.2, p.3, p.4, p.9)
DI-60	A	NP 306.4.219-2018 (VI/11, p.1, p.2, p.4)
DI-61	A	NP 306.4.219-2018 (VI/11, p.1, p.2, p.3, p.4, p.5, p.6; II/11, p.17)
DI-62	A	NP 306.4.219-2018 (VI/10, p.3, p.2)
DI-63	A	NP 306.4.219-2018 (VI/10, p.4)
DI-64	A	NP 306.5.04/2.060-02 (p. 2.19) NP 306.4.219-2018 (VI/10, p.5) NP 305.5.01/3.083-2004 (VIII, p.8.5)
DI-65	A	NP 306.4.219-2018 (VI/8, p.1, p.2, p.4)
DI-66	A	NP 306.4.219-2018 (VI/8, p.1, p.5, p.6)
DI-67	A	NP 306.4.219-2018 (VI/6, p.4, p.6)
DI-68	A	NP 306.4.219-2018 (VII/1, p.1, p.8; II/5, p.4)
DI-69	A	NP 306.4.219-2018 (VII/1, p.5, p.9, p.9, p.9) NP 306.4.223-2020 (VII/2, p.2) NP 306.4.223-2020 (VII/2, p.2) NP 306.4.219-2018 (VII/1, p.13) NP 306.4.219-2018 (II/10, p.1; VII/1, p.13) NP 306.4.219-2018 (VI/4, p.4, p.5; VII/1, p.15)
DI-70	A	NP 306.4.219-2018 (II/8, p.2; VII/1, p.2, p.8, p.10)
DI-71	A	NP 306.5.04/2.060-02 (p. 2.25) NP 306.4.219-2018 (II/11, p.3, p.6) NP 306.4.223-2020 (III/10, p.3, p.2)
DI-72	A	NP 306.4.219-2018 (VII/1, p.16; VII/2, p.3, p.8)
DI-73	A	NP 306.4.219-2018 (VII/1, p.16; VII/2, p.3, p.4)
DI-74	A	NP 306.4.219-2018 (III, p.2; IV/1, p.3; IV/3, p.1; IV/5, p.11) NP 306.4.223-2020 (III/1, p.1; III/5, p.1, p.2)
DI-75	A	NP 306.4.219-2018 (IV/3, p.1; III, p.5; V, p.11)
DI-76	A	NP 306.4.219-2018 (IV/3, p.5: 1), 2), 3), 4))
DI-77	A	NP 306.4.219-2018 (IV/3, p. 2, p.6, p.5: 2), 3))
DI-78	A	NP 306.5.04/2.060-02 (p. 2.28, Annex 4, p.8) NP 306.4.219-2018 (II/11, p.17) NP 306.1.190-2012 (p.7.4.2)
DI-79	A	NP 306.4.219-2018 (III, p.5; VI/2, p.1, p.2)
DI-80	A	NP 306.4.219-2018 (VI/4, p1, p.2)
DI-81	A	NP 306.4.219-2018 (VI/2, p.1)
DI-82	A	NP 306.4.219-2018 (VI/2, p.3; VI/4, p.2)
DI-83	A	NP 306.4.219-2018 (II/11, p.1, p.17) NP 306.5.04/2.060-02 (Annex 3, Annex 4, Annex 5)
DI-84	A	NP 306.5.04/2.060-02 (p. 2.4)

# SRL	Current status	Relevant regulations
DI-85	A	NP 306.4.219-2018 (II/11, p.2, p.1)
DI-86	A	NP 306.4.219-2018 (II/11, p.11) NP 306.4.223-2020 (II, p.2) NP 306.4.219-2018 (II/11, p.5) NP 306.4.219-2018 (II/11, p.4, p.13)
DI-87	A	NP 306.4.219-2018 (II/11, p.11)
DI-88	A	NP 306.4.219-2018 (II/11, p.11; IV/1, p.15; VII/1, p.8; VII/2, p.1, p.6) NP 306.4.223-2020 (II/12, p.3; VIII/6, p.9)
DI-89	A	NP 306.5.04/2.060-02 (p. 2.4) NP 306.4.219-2018 (II/11, p.8) NP 306.4.223-2020 (III/1, p.4)
DI-90	A	NP 306.4.219-2018 (II/11, p.7, p.10)
DI-91	A	NP 306.4.219-2018 (II/11, p.10) NP 306.4.223-2020 (VIII/8, p.7, p.8, p.10)
DI-92	A	NP 306.4.219-2018 (II/11, p.10) NP 306.4.223-2020 (VIII/8, p.7, p.8, p.10)
DI-93	A	NP 306.4.223-2020 (II, p.1)
DI-94	A	NP 306.4.223-2020 (III/2, p.1) NP 306.4.219-2018 (II/11, p.3; VII/1, p.2, p.3, p.4; II/11, p.17)
DI-95	A	NP 306.4.219-2018 (II/11, p.11) NP 306.4.223-2020 (X, p.1, p.2)
DI-96	A	NP 306.4.219-2018 (II/11, p.6, p.9, p.10, p.5, p.7; IV/1, p.8) NP 306.4.223-2020 (X, p.1; VIII/8, p.7, p.8, p.10)
DI-97	A	NP 306.4.219-2018 (II/11, p.17)
DI-98	A	NP 306.4.219-2018 (II/11, p.17) NP 306.4.223-2020 (III/1, p.4) NP 306.4.223-2020 (III/1, p.4, p.17) NP 306.4.219-2018 (II/11, p.17) NP 306.4.219-2018 (II/11, p.17) NP 306.4.219-2018 (II/11, p.18, p.17)
DI-99	A	NP 306.4.219-2018 (II/11, p.3)
DI-100	A	NP 306.4.223-2020 (VI/5, p.1; VI/6, p.3)
DI-101	A	NP 306.4.219-2018 (VII/1, p.8) NP 306.4.223-2020 (VIII/6, p.1, p.2, p.3)
DI-102	A	NP 306.4.219-2018 (II/11, p.11; II/5, p.1, p.5)
DI-103	A	NP 306.4.219-2018 (II/11, p.10)
DI-104	A	NP 306.4.219-2018 (IV/1, p.17) NP 306.4.223-2020 (VIII/1, p.2, p.3, p.4)
DI-105	A	NP 306.4.219-2018 (II/11, p.16)
DI-106	A	Law of Ukraine “On Nuclear Energy Use and Radiation Safety” (Art. 33) NP 306.4.219-2018 (II/11, p.17)
DI-107	A	NP 306.5.04/2.060-02 (p.2.24) NP 306.4.223-2020 (III/1, p.4) NP 306.4.219-2018 (II/11, p.11) NP 306.4.219-2018 (II/11, p.17, p.11) NP 306.4.219-2018 (II/9, p.1) NP 306.4.223-2020 (IX, p.1; X, p.1) NP 306.4.219-2018 (II/11, p.7) NP 306.4.223-2020 (IV/1, p.3; III/1, p.4)

# SRL	Current status	Relevant regulations
		NP 306.4.219-2018 (II/11, p.17) NP 306.4.223-2020 (I/1, p.1)
DI-108	A	NP 306.4.219-2018 (II/11, p.18) NP 306.5.04/2.060-02 (p.2.24, p.2.25)

United Kingdom

The benchmarking of the disposal SRLs showed that the UK regulatory system was largely compliant with the SRLs. There were 101 SRLs scored successfully out of a total of 108. Seven SRLs were scored category C and added to the UK's National Action Plan.

UK Government policy concerning nuclear installations including nuclear safety, security and safeguards, health and safety at work, and transport of civil nuclear and radioactive materials by road, rail and inland waterways is reserved, and regulated by the Office for Nuclear Regulation (ONR). Non-nuclear radioactive substances activities, the policy on the management of radioactive waste for disposal and environmental protection on nuclear and non-nuclear sites, are devolved matters. Alongside the UK government, the Welsh Government, Northern Ireland Executive and Scottish Government each has responsibility for these matters in their respective devolved administration and each is regulated separately. As appropriate, the benchmarking was undertaken against the Environmental Permitting (England and Wales) Regulations 2016 and supporting regulatory framework. Equivalent legislation is provided through the Environmental Authorisations (Scotland) Regulations 2018, as and where it aligns with Scottish Government policy. There are no radioactive waste disposal facilities in Northern Ireland.

Given the nature of these SRLs, the UK's self-assessment was carried out by ONR, and led by the Environment Agency on behalf of the environmental regulators as appropriate, in accordance with our respective legal responsibilities.

The UK is largely compliant with the SRLs. The seven SRLs on the National Action Plan relate to the regulatory framework of the environmental regulators. The UK currently does not operate a geological facility for the disposal of radioactive wastes, and the safe operation of existing near surface disposal facilities is not affected by these seven SRLs.

The documents of relevance to the disposal SRLs for the environmental regulators are:

> *Near-Surface Disposal Facilities on Land for Solid Radioactive Wastes: Guidance on Requirements for Authorisation (NS-GRA)*
> *Geological Disposal Facilities on Land for Solid Radioactive Wastes: Guidance on Requirements for Authorisation (GRA)*

These documents were published in 2009, predating the publication of the disposal SRLs, The two documents are being merged into one and updated, with publication

due in 2026. The updates will address fully the seven SRLs on the National Action Plan.

Two tables are presented below. The first table shows the SRLs that the UK is compliant with and references the relevant underpinning evidence supporting the scores. The second table shows the SRLs on the National Action Plan and the UK's plans to address them.

# SRL #	Current status	Actions taken / relevant regulations
DI-01	A	**Safety:** Licencing of Nuclear Installations; Safety Assessment Principles; **Environment:** Environmental Permit; GRA
DI-02	A	**Safety:** Licence Conditions; Technical Inspection Guide; **Environment:** GRA
DI-03	A	**Safety:** Safety Assessment Principles; **Environment:** GRA
DI-04	A	**Safety:** Licence Conditions; Technical Inspection Guide; **Environment:** GRA
DI-05	A	**Safety:** Licence Conditions; Technical Inspection Guide; **Environment:** GRA
DI-06	A	**Environment:** GRA
DI-07	A	**Safety:** Technical Assessment Guide; **Environment:** GRA
DI-08	A	**Safety:** Licence Conditions; Technical Inspection Guide;
	C	**Environment**
DI-09	A	**Safety:** Licence Conditions; Technical Inspection Guide; **Environment:** GRA
DI-10	A	**Safety:** Technical Assessment Guide; **Environment:** GRA
DI-11	A	**Safety:** Safety Assessment Principles; **Environment:** GRA
DI-12	A	**Safety:** Licence Conditions; **Environment:** GRA
DI-13	A	**Safety:** Technical Assessment Guide; **Environment:** GRA
DI-14	A	**Safety:** Licence Conditions; Safety Assessment Principles; Technical Inspection Guide; **Environment:** GRA
DI-15	A	**Safety:** Licence Conditions; Technical Inspection Guide;
DI-16	A	**Safety:** Technical Inspection Guide; **Environment:** GRA
DI-17	A	**Safety:** Licence Conditions; Safety Assessment Principles; Technical Assessment Guide; Technical Inspection Guide;

# SRL #	Current status	Actions taken / relevant regulations
		Environment: GRA
DI-18	A	**Safety:** Licence Conditions; **Environment:** GRA
DI-19	A	**Safety:** Safety Assessment Principles; **Environment:** GRA
DI-20	A	**Safety:** Licence Conditions; Safety Assessment Principles; Technical Assessment Guide; Technical Inspection Guide; **Environment:** GRA
DI-21	A	**Safety:** Technical Assessment Guide; **Environment:** Environmental Permit
DI-22	A	**Safety:** Safety Assessment Principles; Technical Assessment Guide; **Environment:** GRA; NS-GRA
DI-23	A	**Safety:** Safety Assessment Principles; **Environment:** GRA
DI-24	A	**Environment:** GRA
DI-25	A	**Safety:** Safety Assessment Principles; **Environment:** GRA
DI-26	A	**Environment:** GRA; NS-GRA
DI-27	A	**Environment:** GRA; NS-GRA
DI-28	A	**Environment:** GRA
DI-29	A	**Environment:** GRA
DI-30	C	**Environment**
DI-31	A	**Safety:** Safety Assessment Principles;
	C	**Environment**
DI-32	A	**Environment:** GRA
DI-33	A	**Environment:** GRA
DI-34	A	**Safety:** Joint Guidance The Management of Higher Activity Wastes on Nuclear Licensed Sites. **Environment:** GRA
DI-35	A	**Safety:** Safety Assessment Principles; Technical Assessment Guide;
DI-36	A	**Environment:** GRA
DI-37	A	**Environment:** GRA
DI-38	A	**Safety:** Safety Assessment Principles; Technical Assessment Guide; **Environment:** GRA
DI-39	A	**Safety:** Safety Assessment Principles;
	C	**Environment**
DI-40	A	**Safety:** Safety Assessment Principles; **Environment:** GRA

# SRL #	Current status	Actions taken / relevant regulations
DI-41	C	**Environment**
DI-42	A	**Environment:** GRA; NS-GRA
DI-43	A	**Safety:** Licence Conditions; Safety Assessment Principles;
DI-44	A	**Environment:** GRA
DI-45	A	**Safety:** Safety Assessment Principles; **Environment:** GRA; NS-GRA
DI-46	A	**Safety:** Safety Assessment Principles;
DI-47	A	**Environment:** GRA; NS-GRA
DI-48	A	**Environment:** GRA
DI-49	A	**Environment:** GRA
DI-50	A	**Safety:** Licence Conditions;
DI-51	A	**Environment:** GRA
DI-52	A	**Environment:** GRA
DI-53	A	**Safety:** Licence Conditions; **Environment:** GRA
DI-54	A	**Safety:** Nuclear Installations Act, 1965; Licence Conditions; **Environment:** Environmental Permit
DI-55	A	**Safety:** Licence Conditions;
	C	**Environment**
DI-56	A	**Safety:** Safety Assessment Principles; **Environment:** GRA
DI-57	A	**Safety:** Licence Conditions;
DI-58	A	**Safety:** Licence Conditions; **Environment:** GRA
DI-59	A	**Safety:** Licence Conditions; Safety Assessment Principles; **Environment:** GRA; NS-GRA
DI-60	A	**Safety:** Licence Conditions; **Environment:** GRA;
DI-61	A	**Safety:** Licence Conditions; **Environment:** GRA
DI-62	A	**Safety:** Licence Conditions; Safety Assessment Principles; Technical Inspection Guide; The Radiation (Emergency Preparedness and Public Information) Regulations 2001
DI-63	A	**Safety:** Licence Conditions; Safety Assessment Principles;
DI-64	A	**Safety:** Licence Conditions; Safety Assessment Principles; The Radiation (Emergency Preparedness and Public Information) Regulations 2001
DI-65	A	**Safety:** Licence Conditions; Safety Assessment Principles; **Environment:** GRA;

# SRL #	Current status	Actions taken / relevant regulations
DI-66	A	**Safety:** Licence Conditions; Safety Assessment Principles;
DI-67	A	**Safety:** Technical Assessment Guide;
DI-68	A	**Environment:** GRA;
DI-69	A	**Safety:** Licence Conditions; Safety Assessment Principles; Technical Inspection Guide; **Environment:** GRA; NS-GRA
DI-70	A	**Safety:** Licence Conditions; **Environment:** GRA;
DI-71	A	**Safety:** Licence Conditions; **Environment:** GRA;
DI-72	A	**Safety:** Licence Conditions; **Environment:** GRA;
DI-73	A	**Environment:** GRA;
DI-74	A	**Environment:** GRA; Joint Guidance The Management of Higher Activity Wastes on Nuclear Licensed Sites.
DI-75	A	**Environment:** GRA;
DI-76	A	**Environment:** GRA;
DI-77	A	**Environment:** GRA;
DI-78	A	**Environment:** GRA;
DI-79	A	**Environment:** GRA; NS-GRA
DI-80	A	**Environment:** GRA;
DI-81	C	**Environment**
DI-82	A	**Environment:** GRA;
DI-83	A	**Safety:** Licence Conditions; **Environment:** GRA;
DI-84	A	**Safety:** Licence Conditions; **Environment:** GRA; NS-GRA
DI-85	A	**Safety:** Licence Conditions; **Environment:** GRA; NS-GRA
DI-86	A	**Safety:** Ionising Radiation Regulations 1999; **Environment:** GRA; NS-GRA
DI-87	A	**Safety:** Licence Conditions; **Environment:** GRA;
DI-88	A	**Environment:** GRA; NS-GRA
DI-89	A	**Safety:** Safety Assessment Principles; **Environment:** GRA; NS-GRA
DI-90	A	**Safety:** Safety Assessment Principles; **Environment:** GRA;

# SRL #	Current status	Actions taken / relevant regulations
DI-91	A	**Environment:** GRA;
DI-92	A	**Safety:** Safety Assessment Principles; **Environment:** GRA;
DI-93	A	**Safety:** Safety Assessment Principles; **Environment:** GRA;
DI-94	A	**Safety:** Safety Assessment Principles; **Environment:** GRA;
DI-95	A	**Safety:** Licence Conditions; Technical Inspection Guide; **Environment:** GRA;
DI-96	A	**Environment:** GRA;
DI-97	A	**Safety:** Licence Conditions; Safety Assessment Principles; Technical Assessment Guide; **Environment:** GRA; NS-GRA
DI-98	A	**Safety:** Licence Conditions; Safety Assessment Principles; **Environment:** GRA; NS-GRA
DI-99	A	**Safety:** Licence Conditions; **Environment:** GRA;
DI-100	A	**Safety:** Ionising Radiation Regulations 1999; **Environment:** GRA;
DI-101	A	**Environment:** GRA;
DI-102	A	**Safety:** Safety Assessment Principles; **Environment:** GRA;
DI-103	A	**Safety:** Safety Assessment Principles; **Environment:** GRA;
DI-104	A	**Environment:** GRA;
DI-105	A	**Safety:** Safety Assessment Principles; **Environment:** GRA;
DI-106	A	**Safety:** Licence Conditions; Safety Assessment Principles; **Environment:** GRA;
DI-107	A	**Safety:** Technical Assessment Guide **Environment:** GRA;
DI-108	A	**Safety:** Technical Assessment Guide **Environment:** GRA;

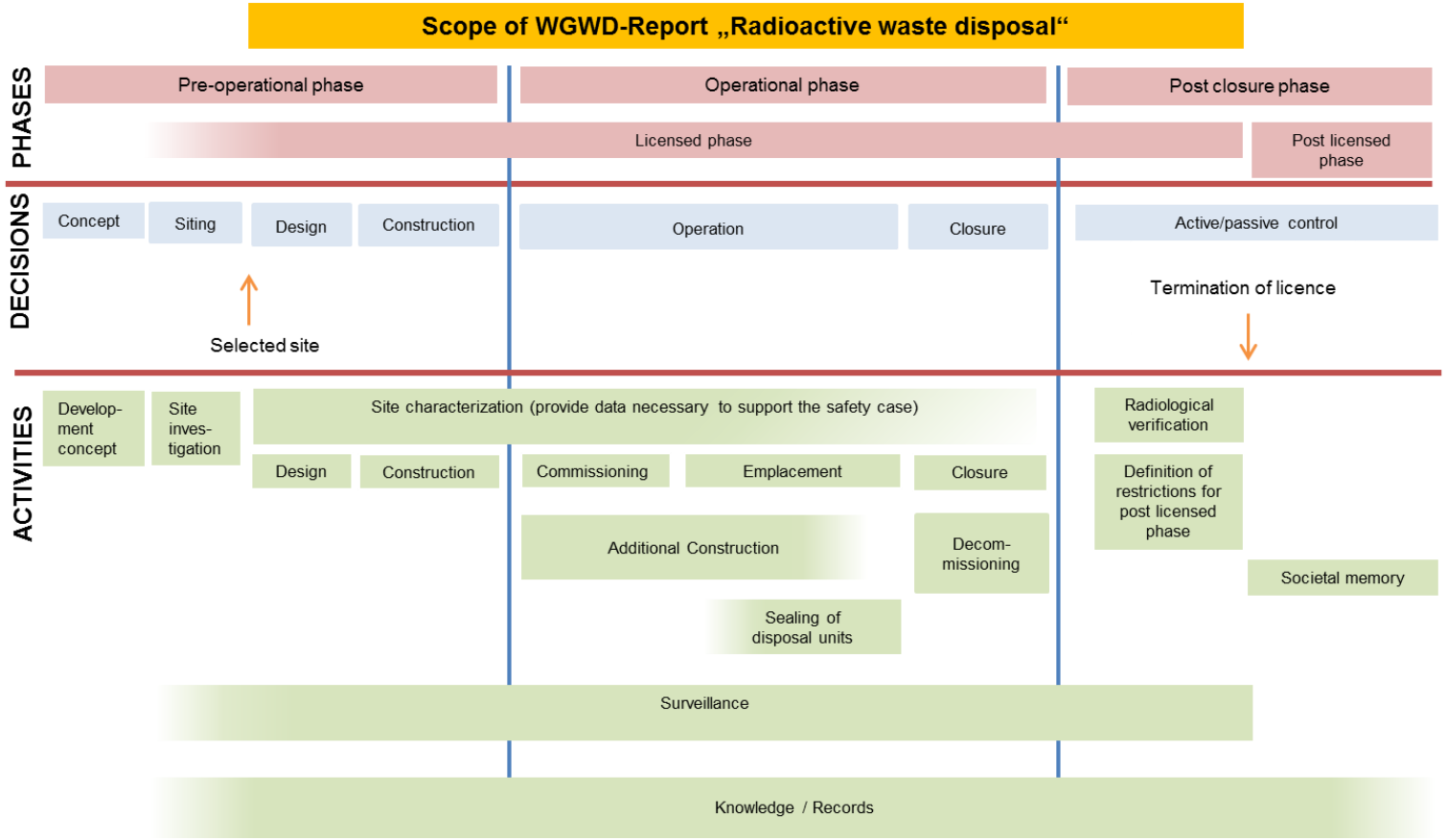
SRLs on the National Action Plan and the UK's plans to address them.

# SRL #	Current status	Actions taken / relevant regulations
DI-08	C	Requirement of the SRL will be met through the update of the GRA
DI-30	C	Requirement of the SRL will be met through the update of the GRA

# SRL #	Current status	Actions taken / relevant regulations
DI-31	C	Requirement of the SRL will be met through the update of the GRA
DI-39	C	Requirement of the SRL will be met through the update of the GRA
DI-41	C	Requirement of the SRL will be met through the update of the GRA
DI-55	C	Requirement of the SRL will be met through the update of the GRA
DI-81	C	Requirement of the SRL will be met through the update of the GRA

Appendix 1

Lifetime of a radioactive waste disposal facility and major decision points – (Schematic diagram)



Appendix 2
Typical content of Waste Acceptance Criteria (WAC) for low- and intermediate level waste

In general terms, waste acceptance requirements might first describe the general disposal related aspects and requirements of the waste packages and then develop into more specific requirements on the waste forms, on the waste containers, on individual radionuclides and activity, on documentation and record keeping, and finally on the delivery of waste packages[6].

Thus, depending upon the near surface or geological disposal facility, waste acceptance requirements might be structured as follows:

(1) Basic requirements on radioactive waste to be disposed of:

- Prohibition of mixing non-radioactive waste with radioactive waste
- Compliance with the requirements of the site-specific safety assessment

(2) General requirements on waste packages:

- Surface dose rate
- Surface contamination
- Hazardous substances content limitation
- Absence of overpressure
- Waste package mass

(3) Requirements on waste forms:

- Basic requirements (e.g., only solid or solidified waste, no free liquid)
- Specific requirements (e.g., stabilization (dispersion inhibition), heterogeneity, chemical restrictions)
- With immobilization binder (e.g., bitumen, polymer or cement)
- Without immobilization binder (e.g., radioactivity and radionuclide restrictions)

[6] Development of specifications for radioactive waste packages. IAEA TECDOC 1515, Vienna ,2001

(4) Requirements on waste containers:

- Basic requirements (e.g. geometric shape and dimensions, stackability, mechanical handling features)
- Specific requirements (e.g. mechanical stability, thermal resistance, leak tightness, shielding function)
- Inner containers (e.g. surface coating, seals, vents, void space restrictions)

(5) Limitations of activity:

- Permissible activities for individual radionuclides
- Permissible total activity per waste package
- Permissible total alpha and beta/gamma emitter activity
- Declaration of radionuclide-specific activity/total activity per waste package

(6) Delivery of waste packages:

- Compliance with transport regulations
- Permits/documentation including record keeping
- Marking of waste packages
- Requirements on transport containers
  Regardless of the requirements for a near surface or geological disposal facility, the regulations on transporting dangerous goods and waste packages with fissile material must be followed.

Appendix 3
Typical Contents of a Safety Case

Introduction

For a disposal facility, the preparation of a safety case including the supporting safety assessment is a step-by-step development. The safety case is progressively developed and refined as the disposal facility project proceeds. This process continues until the termination of the licence throughout the pre-operational, the operational and the post-closure phases, with integration of operating experience feedback and results of R&D and monitoring.

Safety strategy through the step-by-step development

An important challenge is to preserve the awareness of the safety objectives throughout the development and implementation of the disposal facility. A safety strategy, which sets out the high-level approach for achieving safe disposal and for managing the activities required to develop the disposal facility, has to be established from the beginning of the pre-operational phase.

The safety strategy describes the processes and methods that will ensure that the disposal facility meets the safety objective. Main components of the safety strategy are::

- The management strategy related to disposal facility development and implementation ensuring that the work focuses on the safety objectives, that adequate resources are available and that activities are correctly carried out and co-ordinated.
- The conceptualization and implementation strategy including approaches and choices for selecting a site, developing a concept, implementing practical engineering solutions and monitoring.
- The safety assessment strategy describing the approach to assessing safety and to building confidence in the assessment results.

The safety strategy is iteratively applied during each programme step. At each step, constraints may be imposed by the prevailing circumstances (scientific and technical state of the art, socio-economic situation, national legislation). These constraints and their safety implications should be clearly identified.

The safety strategy should remain consistent during the different phases of disposal facility development. However, the implementation priorities and methods may evolve to take into account experience, technical developments, societal inputs, and new national and international standards and guidance.

Typical content of a safety case

In accordance with the principle of applying a graded approach, the content and the level of detail expected for each element in the safety case should be proportionate to the hazard presented by the waste to be disposed of in the facility concerned and should be appropriate to the regulatory decision step reached.

The safety case should contain the following elements, among others:

1. Purpose and context of the safety case Outline of the disposal programme

    - Legal framework
    - Current step or decision point within the programme
    - Key decisions that have already been taken or that will need to be taken in the future
    - Objectives of the safety case, in relation to the stage reached in the disposal programme

2. Safety Strategy:

    - Identification of the constraints imposed by the prevailing circumstances (scientific, technical, socio-economic, etc.) and of their implications on the safety strategy
    - Management strategy
        - Approach for managing the various activities, ensuring that work focuses on safety objectives and that adequate resources are available (including approach for ensuring quality)
        - Approach for post-closure long-term information management and record-keeping
        - Approach for confirming assumptions and for managing uncertainties (reducing and avoiding uncertainties and mitigating their effects)
        - Approach for implementing the optimization of protection principle
            - consideration of how alternative options will be evaluated.

    - Conceptualization and implementation strategy:
        - Approach to containment and isolation
        - Approach for achieving post-closure safety by passive means
        - Approach for ensuring defence in depth
        - Approach for ensuring reversibility/retrievability if, and to the extent, required
        - Approach for implementing practical engineering solutions and monitoring

    - Safety assessment strategy
        - Approach for assessing the radiological impact and the performance of the disposal system and of its components.
        - Approach for assessing the technical feasibility of the disposal system
        - Approach for building confidence in the assessment

3. Assessment basis

- Analysis tools (assessment methods, models, computer codes and databases) supporting the safety assessment and processes for qualifying them and building confidence in them
- Scientific and technical data and understanding relevant to the safety assessment:
  - Site description (geology, hydrogeology, climate, biosphere, demography, ...)
  - Waste description (waste and container characteristics, inventory and its evolution)
  - Overall description of the disposal system:
    - Design requirements (to meet the safety strategy)
    - Safety functions assigned to the disposal system and to its components post-closure, and evolution with time
    - Understanding of processes
  - Facility description:
    - Design options (reference option and alternatives)
    - Disposal facility characteristics
  - Safety functions assigned to the disposal facility and to its components during operation, and changes with time
  - Plans (for construction, waste package emplacement, for retrievability and reversibility if required, for closure, etc.)
  - As-built description of the part of the disposal facility already implemented
  - Description of any changes to the reference design from the previous phase

- Identification of the uncertainties and their evolution with time
- Technical feasibility of the design options (feasibility studies including demonstration tests)
- Knowledge
  - State of the art
  - Results from research programmes
  - Feed-back from experience during construction, operational activities, monitoring
  - Synthesis of process understanding

- Operational issues:
  - Site & engineering assessment basis relevant to operational safety assessment
  - Normal operation and accident conditions, OLC's (including WAC, radiation protection system)
  - Description of facility commissioning
  - Ageing of facility components (periodic inspection and maintenance programmes)
  - Activities for the decommissioning of auxiliary facilities
  - Procedures and operating manuals for activities with significant safety implications
  - Operating inspection, maintenance and testing provisions
  - Operating experience feedback

- Monitoring (baseline, disposal system and environmental monitoring programme)

4. Operational and post-closure safety assessment

   Site and engineering assessment

   - Substantiation that the safety requirements are met:
     - Appropriateness of the design
     - Substantiation that there is adequate defence in depth
     - Ability of each component to fulfil its expected role; evolution of its performance with time
   - Performance and robustness assessment:
     - Establishment of performance indicators
     - Identification and quantification of the circumstances and phenomena that may affect system performance
     - Scenario and model development to assess performance and robustness
     - Assessment of the performance and robustness of the system and its components,
     - Demonstration that the as-built facilities meet the design basis and requirements
     - Operational safety assessment:
       - Substantiation that facility meets the operational safety requirements and is operated in accordance with the conditions of the licence
       - Safety assessment for possible waste retrieval (in case of a waste package defect)
   - Feasibility assessment
   - Fault and accident analysis

   Radiological and non-radiological impact assessment

     - Establishment of safety indicators
     - Identification and quantification of the circumstances and phenomena that may affect the radiological impact (includes assessment of radionuclide release and transport)
     - Operational/post-closure safety analysis:
       - Scenario and model development to assess radiological and non-radiological impacts
       - Assessment of radiological exposures that might arise during operation /during the post-closure long-term evolution of the facility
       - Substantiation that the estimation of radiological impact is conservative

   - Demonstration of the reliability of the safety assessment
     - Reasons for and substantiation of the simplifications
     - Description of how uncertainties are dealt with in the safety assessment.

5. Management system

   - Organisational structure for the present phase and organization planned for future phases

- Organization and arrangements for QA of safety-related activities/Audits and verification activities to confirm that implementation is correct, and periodic re-assessment of the management system
- Qualification and training of personnel
- Arrangements for physical protection and safeguards
- Emergency preparedness
- Provisions for information management, conservation of post-closure long-term memory of the disposal facility and record-keeping procedures, ensuring traceability of decisions made
- Programme of planned activities through the different phases

6. Integration of safety arguments and evidence

- Integration of the safety arguments and evidence from the assessments.
- Confirmation that the safety strategy and the safety requirements are correctly implemented
- Substantiation that the design has been developed through a process involving optimization of radiological protection
- Argument supporting a decision to proceed to the next phase
- Evaluation of the confidence in the assessment results/Identification of the limitations of the currently available evidence, arguments and analyses
- Methodology for addressing and managing lack of knowledge, unresolved questions and uncertainties that might undermine safety, in respect of:
- development of the design
- data acquisition from research and development programmes
- scenario development and modelling

Appendix 4
Expected content of a Periodic Safety Review

Taking into account modifications to the structures, systems and components (SSC) and layout of the facility, to the procedures, and to the organization, and lessons learnt from R&D, monitoring, maintenance, testing, inspection and ageing-management programmes, the Periodic Safety Review (PSR) should, as a minimum:

- Review and analyse the operational experience accumulated with equipment, structures, systems and components, including their maintenance, inspection and control; any operational occurrences or accidents that have happened, their root cause analysis and the corrective actions taken; and any modifications of the facility, of the operational procedures and of the organization.
- Review the waste acceptance criteria, taking into account the current state of knowledge and experience in physico-chemical and radiological characterisation; review the waste acceptance process, including how waste production is controlled and how compliance with waste acceptance criteria is confirmed; and assess the overall impact on safety of deviating waste accepted for disposal.
- Review the operating experience in radiological protection aspects for workers and the public, including the control of emissions/release/discharges and the assessment of the radiological impact on the environment.
- Review the knowledge and experience of aspects affecting post-closure safety, including an analysis of the performance and potential evolution of barriers, the site and the biosphere. Review the assumptions made in the safety case to confirm that they are still valid.
- Review compliance with current regulatory requirements (national and international).
  - Identify any significant deviations from applicable current standards and good practice and evaluate their significance for safety;
  - Identify any conflicting requirements between different regulatory regimes.
- Review whether the objectives for operation, closure and post-closure remain achievable.