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## Regulation

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# REGULATION ON DISPOSAL OF SPENT FUEL AND RADIOACTIVE WASTE (FANR-REG-27)

**(in force as of 26 March 2019)**

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## Definitions

### Article (1)

For the purposes of this regulation, the following terms shall have the meanings set forth below. Other capitalised terms used but not defined herein shall have the meaning ascribed to them in Article 1 of the Federal Law by Decree No. 6 of 2009 Concerning the Peaceful Uses of Nuclear Energy (the Law).

<b>Barrier(s)</b>	Two or more natural or engineered barriers used to isolate Radioactive Waste and prevent radionuclide migration from a Radioactive Waste Repository.
<b>Biosphere</b>	The part of the environment normally inhabited by living organisms and generally taken to include the atmosphere and the earth's surface including the soil, surface water bodies, seas and oceans and their sediments at the depth affected by basic human actions particularly farming. Biosphere is normally distinguished from the Geosphere.
<b>Buffer Zone</b>	A Buffer Zone is a section of the Disposal Site that is controlled by the Licensee and that lies under the Disposal Site and between the inner boundary of the Disposal Site and any Disposal Unit.
<b>Defence-in-depth</b>	Defence-in-depth in a Radioactive Waste Repository means the use of multiple independent and (where possible) redundant layers of defence such that no single layer, no matter how robust, is exclusively relied upon. Defence-in-depth for a Radioactive Waste Repository includes (but is not limited to) the use of Siting, Waste Forms and radionuclide content, engineered features, and natural geologic features of the Disposal Site to strengthen the resilience of the Radioactive Waste Repository structure and components.
<b>Disposal Site</b>	The section of the Radioactive Waste Repository that is used for the Disposal of Radioactive Waste and consists of Disposal Units and a Buffer Zone.
<b>Disposal System</b>	The system of properties of the site for a Radioactive Waste Repository, Design of the Radioactive Waste Repository, items and physical structures, procedures for control, characteristics of Radioactive Waste, and other elements that contribute in different ways and over different timescales to the fulfilment of Safety functions for Disposal.

<b>Disposal Unit</b>	The discrete section of the Disposal Site into which Radioactive Waste is placed for Disposal.
<b>Dose Constraint</b>	A prospective and source of radiation related restriction on the individual Dose from a source of radiation, which provides a basic level of Radiation Protection for the most highly exposed individuals to Ionizing Radiation from a source of radiation, and serves as an upper bound on the Dose in Optimisation of Radiation Protection for that source of radiation. For Occupational Exposures, the Dose Constraint is a value of individual Dose used to limit the range of options considered in the process of Optimisation. For Public Exposure, the Dose Constraint is an upper bound on the annual Doses that members of the public may receive from the planned Operation of any controlled source of radiation.
<b>Geological Radioactive Waste Disposal Facility</b>	A Radioactive Waste Repository for Radioactive Waste Disposal located in the Geosphere (usually several hundred meters or more below the surface) in a stable geological formation to provide long-term isolation of radionuclides from the Biosphere.
<b>Geosphere</b>	Those parts of the lithosphere not considered to be part of the Biosphere and consisting of the subsoil and rock from the soil that are not part of the Biosphere.
<b>Integrated Management System</b>	A system that cohesively brings together the requirements for managing and monitoring a business in a planned and systematic manner.
<b>Institutional Control</b>	Control of a Disposal Site after its Closure by the Licensee or by an authority or institution designated under the laws of the State. This control may be active (e.g. monitoring, surveillance, remedial work) or passive (e.g. land use control) and may be a factor in the Design of a Disposal Site.  For the purposes of this regulation, the active Institutional Control period is referred to as a post-Closure control period. Institutional Control hereafter refers only to passive Institutional Control.
<b>Naturally Occurring Radioactive Material</b>	Material containing no significant amounts of radionuclides other than naturally occurring radionuclides
<b>Near Surface Radioactive Waste Disposal Facility</b>	A Radioactive Waste Repository for Radioactive Waste Disposal located at or within tens of meters of the Earth's surface.

<b>Optimisation</b>	<p>The process of determining the levels of Radiation Protection and Safety, which makes exposures to Ionizing Radiation and the probability and magnitude of potential exposures to Ionizing Radiation ‘as low as reasonably achievable’ (ALARA), economic and social factors being taken into account as required by the International Commission on Radiological Protection ‘System of Radiological Protection’.</p> <p>Optimise, Optimised and Optimising shall be construed accordingly.</p>
<b>Representative Person</b>	An individual receiving a Dose that represents the Doses of the more highly-exposed individuals in the public.
<b>Risk Constraint</b>	A prospective and source of radiation related value of individual risk that is applied in a planned exposure situation to Ionizing Radiation as a parameter for the Optimisation of Radiation Protection and Safety, and that serves as a reference limit in defining the range of options in Optimisation. The Risk Constraint is a source of radiation related value that provides a basic level of Radiation Protection for the individuals most at risk of exposure to Ionizing Radiation. This risk is a probability of an unintended event that results in exposure to Ionizing Radiation and the probability of the detriment due to the Dose received as a result of such exposure. Risk Constraints apply to the potential exposure to Ionizing Radiation.
<b>Safety Case</b>	A collection of arguments and evidence in support of the Safety of a Facility or Activity including the findings of a Safety Assessment and a confirmation of the validity of these findings.
<b>Single Source</b>	A complex or multiple installation situated at one location or site.
<b>Siting</b>	The process of selecting a suitable site for a Facility including the appropriate Assessment and definition of the related Design basis.
<b>Structures, Systems and Components</b>	A general term encompassing all the elements of a Facility or Activity except for human factors, which contribute to protection and Safety. Structures are the passive elements such as building vessels and shielding. A system within a Structure, System and Component comprises several components assembled in such a way as to perform a specific active function, and a component within a Structure, System and Component is a discrete element of the Structures, Systems and Components system.

**Waste Form**

Radioactive Waste in its physical and chemical form after treatment and/ or conditioning prior to packaging. The Waste Form is a component of the Waste Package.

**Waste Package**

The product of conditioning that includes the Waste Form and any containers and internal barriers such as absorbent materials and liners as prepared in accordance with requirements for handling, transport, Storage and/ or Disposal.

## Objective and Scope

### Article (2)

1. The objectives of this regulation are as follows:
  - a) pursuant to Article (25)(15) of the Law to designate the following as Regulated Activities involving a Facility including a Radioactive Waste Repository:
    - Selection of a site for the Construction of a Facility
    - Preparation of a site for Construction of a Facility
    - Construction of a Facility
    - Commissioning of a Facility
    - Operation of a Facility
    - Closure or a change in the Closure date of any Facility
    - Decommissioning of a Facility
  - b) to establish the Safety requirements for the Disposal of all types of Radioactive Waste except Radioactive Waste that has been exempted from Disposal in a Radioactive Waste Repository.
  - c) to establish the requirements that shall be satisfied in the Disposal of Radioactive Waste during the Siting, Design, Construction, Operation, Closure and the post-Closure control period, and the Institutional Control of a Radioactive Waste Repository.
2. For the purpose of this regulation, Spent Nuclear Fuel is considered as high-level Radioactive Waste for Disposal. The requirements of this regulation shall be considered and implemented in conjunction with the requirements from other applicable regulations issued by the Authority pursuant to the Law.
3. The transport of Radioactive Waste to a Radioactive Waste Repository is subject to the requirements of the FANR Regulation 13 for the Safe Transport of Radioactive Materials (FANR-REG-13).
4. Physical Protection and security aspects shall be considered during the Operation and post-Closure control period of the Radioactive Waste Repository in accordance with requirements in FANR Regulation 08 for the Physical Protection for Nuclear Materials and Nuclear Facilities (FANR-REG-08) and FANR Regulation 23 for the Security of Radioactive Sources (FANR-REG-23).
5. The Disposal of Spent Nuclear Fuel and any other Nuclear Material defined by FANR Regulation 10 for the System of Accounting for and Control of Nuclear Material and Application of Additional Protocol (FANR-REG-10) shall be subject to safeguards applied in accordance with the Agreement between the United Arab Emirates and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-proliferation of Nuclear Weapons (hereinafter referred to as the 'Safeguards Agreement'), the Protocol Additional to the Safeguards Agreement and requirements of FANR-REG-10.
6. A Radioactive Waste Repository includes the land, buildings, structures, systems and equipment, which are intended to be used for the Disposal of Radioactive Waste.
7. Radioactive Waste Repositories addressed in this regulation are Geological Radioactive Waste Disposal Facilities and Near Surface Radioactive Waste Disposal Facilities. Any

reference to a Radioactive Waste Repository will encompass the two said Facilities unless the reference is expressly made only to one of them.

## **Licence Required**

### **Article (3)**

1. No person or entity shall commence a Regulated Activity pertaining to a Radioactive Waste Repository without a Licence from the Authority authorising such Regulated Activity.
2. Regulated Activities related to a Radioactive Waste Repository are:
  - a) Siting of the Radioactive Waste Repository
  - b) Preparation of the site for the Radioactive Waste Repository and Construction of the Radioactive Waste Repository
  - c) Commissioning of the Radioactive Waste Repository
  - d) Operation of the Radioactive Waste Repository including the receipt, possession and Disposal of Radioactive Waste
  - e) Closure and post-Closure observation and Maintenance of the Radioactive Waste Repository
3. At the Authority's discretion, a Licence may authorise one or more Regulated Activities listed in Article (3)(2) of this regulation.
4. An application for a Licence shall consist of general information, specific technical information, and institutional information as set forth in Article (4) to Article (11) of this regulation as part of the Safety Assessments and environmental impact Assessments. The Licence application shall include a Radioactive Waste Repository Closure plan.
5. An application to amend a Licence shall be submitted to the Authority and shall fully describe and justify the desired amendments.
6. Any expiry, suspension, revocation or surrender of a Licence for Operation shall not relieve the Licensee of the responsibility of Closure of the Radioactive Waste Repository, responsibilities during the post-Closure control period, and transfer of responsibility for Institutional Control to an authority or institution designated under the laws of the State.
7. Prior to the Closure of the Radioactive Waste Repository or as otherwise directed by the Authority, the Licensee shall submit an application to amend the Licence for Operation with a view to the Closure of the Radioactive Waste Repository. Such an application shall be filed at least two (2) years prior to the expiry of the Licence for Operation.
8. Upon review of the application to amend the Licence for Operation with a view to the Closure of the Radioactive Waste Repository, the Authority shall issue an amended Licence for Operation to authorise the Closure of the Radioactive Waste Repository if there is reasonable assurance that the performance objectives set forth in Article (4) of this regulation will be met.
9. At the end of the post-Closure control period, the Licensee shall apply for termination of the amended Licence for Operation and Closure of the Radioactive Waste Repository with a view to transferring the responsibility for Institutional Control of the Disposal Site from the Licensee to an authority or institution designated under the laws of the State. The Authority shall issue an amendment to authorise such transfer if the requirements under Article (13) of this regulation are met.

10. The Authority shall terminate the amended Licence for Operation upon an application by the Licensee requesting such termination if the requirements under Article (14) of this regulation are met.
11. The Authority may incorporate in any Licence at the time of issuance or thereafter through appropriate regulation any additional requirements and conditions with respect to the licensed Regulated Activity as it deems appropriate or necessary for the protection of health or environment or to minimise risks to life or damage to property.
12. Radioactive Waste resulting from the treatment of Naturally Occurring Radioactive Material residues is not subject to delivery to the entity designated by the Cabinet in accordance with Article (41)(2) of the Law.

## **Performance Objectives for a Radioactive Waste Repository**

### **Article (4)**

1. A Radioactive Waste Repository shall be sited, designed, operated, closed and controlled (even after its Closure) so that reasonable assurance exists that Occupational Exposures and Public Exposures will be within the limits established in FANR Regulation 04 for Radiation Dose Limits and Optimisation of Radiation Protection for Nuclear Facilities (FANR-REG-04), and in the performance objectives set forth in Article (4) of this regulation.
2. The Radioactive Waste Repository (considered as a Single Source) shall be designed such that the estimated Dose or risk (i.e. probability of fatal cancer or serious hereditary effects) to the Representative Person, who might be exposed to Ionizing Radiation after Closure as a result of possible natural processes affecting the Radioactive Waste Repository does not exceed a Dose Constraint of 0.3 mSv per year or a Risk Constraint of the order of  $10^{-5}$  per year.
3. The Siting, Construction, Operation and Closure of the Radioactive Waste Repository shall prevent any individual from inadvertently intruding into or occupying the Disposal Site or coming into contact with the Radioactive Waste at any time during Institutional Control.
4. The Siting, Construction, Operation and Closure of the Radioactive Waste Repository shall ensure the protection (including the Radiation Protection) of any individual who inadvertently intrudes into or occupies the Disposal Site or comes into contact with the Radioactive Waste at any time during Institutional Control.
5. The Siting, Construction, Operation and Closure of the Radioactive Waste Repository shall ensure that exposures to Ionizing Radiation are Optimised and in compliance with the requirements for Radiation Protection in FANR Regulation 11 for Radiation Protection and Predisposal Radioactive Waste Management for Nuclear Facilities (FANR-REG-11).
6. The Radioactive Waste Repository shall be sited, designed, constructed, operated and closed to eliminate to the extent practicable the need for ongoing active Maintenance of the Disposal Site following the Closure of the Radioactive Waste Repository so that only surveillance, monitoring or minor oversight are required.
7. The Disposal Unit in the Geological Radioactive Waste Disposal Facility shall be designed so that any or all of the emplaced Radioactive Waste can be retrieved within a reasonable period starting at any time up to fifty (50) years after the Radioactive Waste emplacement operations have been initiated unless a different time frame has been approved or specified by the Authority.

## **Siting**

### **Article (5)**

1. An application for a Licence for the Siting of a Radioactive Waste Repository shall include conceptual Design and planning, a description of the site selection, area survey, site characterisation plan and site confirmation.
2. Unless otherwise determined by the Authority, site characterisation for a Geological Radioactive Waste Disposal Facility shall include a programme of in-situ exploration and testing at the depths at which Radioactive Waste will be emplaced.
3. The site characterisation plan for a Radioactive Waste Repository shall contain:
  - a) a general plan for site characterisation activities to be conducted at the site to be characterised;
  - b) a description of the possible Waste Form and Waste Package for the Radioactive Waste to be emplaced in such Radioactive Waste Repository, a description (to the extent practicable) of the relationship between such Waste Form and Waste Package and the host environment at such site, and a description of the activities being conducted by the Licence applicant with respect to such possible Waste Form and Waste Package or their relationship; and
  - c) a conceptual Design for the Radioactive Waste Repository operations area that takes into account likely site-specific requirements.
4. An application for a Licence for the Siting of a Radioactive Waste Repository shall include a description of the natural and demographic Disposal Site characteristics as determined by Disposal Site selection and characterisation activities.

## **Safety Requirements for the Design, Construction, Operation and Closure of a Radioactive Waste Repository**

### **Article (6)**

1. The Radioactive Waste Repository shall be designed, constructed, 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, Closure and management of the Radioactive Waste Repository, and of the performance and Safety of the Disposal System. The Licensee of a Radioactive Waste Repository shall be responsible for its Safety provided by means of multiple Safety functions.
2. A Safety Case and supporting Safety Assessment including environmental impact Assessments shall be prepared by the Licence applicant and updated by the Licensee (as necessary) at each step in the phases of Design, Construction, Commissioning, Operation, Closure, post-Closure control and Institutional Control of a Radioactive Waste Repository. The Safety Case and supporting Safety Assessment shall be submitted to the Authority for approval. The Safety Case and supporting Safety Assessment shall be sufficiently detailed and comprehensive to provide the necessary technical input to the Authority.
3. The Safety Case for a Radioactive Waste Repository shall describe all Safety relevant aspects of the site, Design, Construction, Operation and Closure of the Radioactive Waste Repository and the managerial control measures. The Safety Case and supporting Safety Assessment including environmental impact Assessments shall demonstrate a sufficient level of Radiation Protection provided for the workers, the public and the environment, and

shall provide assurance to the Authority and other interested parties that Safety requirements will be met by the Licensee.

4. The Safety Case and supporting Safety Assessment for a Radioactive Waste Repository shall be documented to a level of detail and quality sufficient to inform and support the decision to be made at each step in the phases of Siting, Design, Construction, Commissioning, Operation, Closure, post-Closure control and Institutional Control of a Radioactive Waste Repository, and to allow for an independent review by the Authority of the Safety Case and supporting Safety Assessment.
5. The site for a Radioactive Waste Repository shall be characterised at a level of detail sufficient to support the understanding of both the characteristics of the site and the site's natural evolution over time. The site characteristics shall include its present condition, its probable natural evolution and estimated natural events, and also human actions that are reasonably foreseeable during the lifetime of the Radioactive Waste Repository consistent with current practices in the region. It shall also include a specific understanding of the impact on Safety of features, events and processes associated with the site and the Radioactive Waste Repository.
6. The host environment shall be selected, and the engineered Barriers of the Radioactive Waste Repository shall be designed and operated to ensure that Safety is provided by means of multiple Safety functions. Containment and isolation of the Radioactive Waste shall be provided by means of physical Barriers of the Disposal System until radioactive decay has significantly reduced the hazard posed by the Radioactive Waste. The capability of the individual Barriers and controls together with that of the overall Disposal System to perform as detailed in the Safety Case shall be demonstrated. The overall performance of the Disposal System shall not be unduly dependent on a single Safety function. Adequate Defence-in-depth shall be ensured by demonstrating that long-term Safety is provided by means of multiple Safety functions.
7. The engineered and physical Barriers that make up the Disposal System shall consist of physical matters such as the Waste Form, the Waste Package, the backfill, and the host environment and geological formation. A Safety function may be provided by means of a physical or chemical property or process that contributes to containment and isolation such as the impermeability to water; limited corrosion, dissolution, leach rate and solubility; retention of radionuclides; and retardation of radionuclide migration.
8. The Radioactive Waste Repository and its engineered Barriers including the Waste Form and Waste Package shall be designed to contain the Radioactive 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 the Closure that complement those features afforded by the host environment. The features shall aim to provide isolation for several hundreds of years for short-lived Radioactive Waste and at least several thousands of years for intermediate and high-level Radioactive Waste. In so doing, consideration shall be given to both the natural evolution of the Disposal System and events causing disturbance of the Radioactive Waste Repository.
9. The Radioactive Waste Repository and its engineered Barriers shall be designed to provide Safety during the life of the Radioactive Waste Repository so that Safety is ensured by passive means to the fullest extent possible, and that there is less need for actions to be taken after the Closure of the Disposal Site. An appropriate level of surveillance and control shall be applied to protect and preserve the Safety features to the extent necessary so that the Radioactive Waste Repository and its engineered Barriers can fulfil the functions that they are assigned in the Safety Case for Safety after Closure.

10. The Radioactive Waste Repository shall be constructed in accordance with the Design as described in the approved Safety Case and supporting Safety Assessment. It shall be constructed in such a way so as to preserve the Safety function(s) 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 so as to ensure Safety during the operational period.
11. Operation of the Radioactive Waste Repository shall be conditional on the completion of the Commissioning programme demonstrating that the Radioactive Waste Repository (as constructed) is consistent with the Design and Safety requirements as has been described in the Safety Case.
12. The Radioactive Waste Repository shall be operated in accordance with the conditions of the Licence for Operation 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 detailed in the Safety Case that are important to Safety after the Closure of the Radioactive Waste Repository.
13. The Radioactive Waste Repository shall be closed provided it is verified that the engineering Safety features, which provide for Safety functions considered in the Safety Case for the post-Closure control period, are functioning as they are designed. Plans for Closure including the transition from active management of the Radioactive Waste Repository including the Disposal Site shall be well-defined and practicable so that Closure can be carried out safely at an appropriate time.
14. During the period when Closure of the Radioactive Waste Repository is being carried out, the Licensee is in a Disposal Site Closure phase. The Licensee shall remain at the Disposal Site for a period of post-Closure control for observation and Maintenance to ensure that the Disposal Site is stable and ready for transfer of responsibility for Institutional Control in accordance with this regulation.
15. At the end of the post-Closure control period, the Licensee will apply for an amendment of the Licence for Operation and Closure in order to obtain authorisation of transfer of its responsibility for Institutional Control of the Disposal Site to the authority or institution designated under the laws of the State according to Article (13) of this regulation.

## **Assurance of Safety**

### **Article (7)**

1. Waste Packages and unpackaged Radioactive Waste accepted for emplacement in a Radioactive Waste Repository shall conform to Radioactive Waste acceptance criteria that are fully consistent with (and derived from) the Safety Case for the Radioactive Waste Repository in the Operation, Closure and post-Closure control period, and during Institutional Control and beyond.
2. Monitoring programme(s) shall be carried out prior to and during the Construction and Operation of a Radioactive Waste Repository and post-Closure control period. These programme(s) shall be designed to collect and update information necessary for the purpose of Radiation 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 Radioactive Waste Repository. Monitoring shall also be carried out to confirm the absence of any conditions that affect the Safety of workers and members of the public, and protection of the environment after the Closure of the Radioactive Waste Repository.

3. A monitoring programme for the engineered Barriers of the Disposal Units including the Waste Packages shall be established and conducted.
4. Ageing management programmes shall be implemented to ensure that required Safety functions of Structures, Systems and Components are fulfilled over the entire operating lifetime of the Radioactive Waste Repository.
5. Plans shall be prepared for the period after the post-Closure control of the Radioactive Waste Repository to address Institutional Control, and arrangements shall be made to maintain the availability of information like permanent structures or markers warning against intrusion on the Disposal Site. These plans shall be consistent with Safety features and shall form part of the Safety Case on which approval by the Authority for Closure of the Radioactive Waste Repository is based.
6. In the Design and Operation of a Radioactive Waste Repository subject to agreements on accounting for and control of Nuclear Material, consideration shall be given to ensuring that Safety is not compromised by the requirements under the system of accounting for and control of Nuclear Material in FANR-REG-10.
7. Measures shall be implemented to ensure an integrated approach to the application of Safety measures and Nuclear Security measures in the Disposal of Radioactive Waste.
8. An Integrated Management System shall be applied to all Safety related activities, systems and components throughout all the steps of the development and Operation of a Radioactive Waste Repository. The level of Safety assurance for each element shall be commensurate with its importance to Safety.

### **Environmental Monitoring Programmes**

#### **Article (8)**

1. At the time the applications for Licences for Construction and Operation of a Radioactive Waste Repository are submitted, the Licence applicant shall have conducted a pre-operational monitoring programme to provide basic environmental data on the Radioactive Waste Repository site characteristics. The Licence applicant shall obtain and submit the information about the ecology, meteorology, climate, hydrology, geology, geochemistry and seismology of the site. For those characteristics that are subject to seasonal variation, data shall cover at least a twelve-month period.
2. During the Construction of the Radioactive Waste Repository, the Licensee shall implement and maintain a monitoring programme. Measurements and observations shall be made and recorded to provide data to evaluate the potential impact on the site characteristics during the Construction of the Radioactive Waste Repository and to enable the evaluation of long-term effects and the need for mitigating measures.
3. During the Operation of the Radioactive Waste Repository, the Licensee shall establish and conduct a monitoring programme to reasonably ensure that Doses to the public during normal operations of the Radioactive Waste Repository are controlled and that the requirements on Dose limits in FANR Regulation 04 for Radiation Dose Limits and Optimisation of Radiation Protection for Nuclear Facilities (FANR-REG-04) are met. The monitoring programme shall be capable of providing an early warning of release of radionuclides from the Disposal Site before it leaves the Disposal Site boundary.
4. The Licensee is responsible for taking corrective measures if the migration of radionuclides would indicate that the performance objectives set forth in Article (4) of this regulation may not be met.

5. Once the Closure of the Radioactive Waste Repository has occurred, the Licensee shall maintain a monitoring system based on the history of Operation and the Closure, and shall be responsible for post-Closure control observation and Maintenance to ensure that the Disposal Site is stable and ready for transfer of responsibility for Institutional Control. The monitoring system shall be capable of providing an early warning of radionuclide release from the Disposal Site before it leaves the Disposal Site boundary.

### **Radiation Protection during Operation**

#### **Article (9)**

1. A Radiation Protection Programme commensurate with the radiological hazards shall be established to ensure that Doses to workers and the public during normal operations of the Radioactive Waste Repository are controlled, and that the requirements on Dose limits in FANR Regulation 04 for Radiation Dose Limits and Optimisation of Radiation Protection for Nuclear Facilities (FANR-REG-04) are met. Every reasonable effort shall be made to keep exposures as low as reasonably achievable (ALARA).
2. The Radiation Protection Programme shall comply with FANR Regulation 11 for Radiation Protection and Predisposal Radioactive Waste Management for Nuclear Facilities (FANR-REG-11).
3. The Radiation Protection Programme shall be submitted to the Authority for approval by the applicant of Licences for Construction and Operation.

### **Radiation Protection after Closure**

#### **Article (10)**

The Safety objective is to site, Design, construct, operate and close a Radioactive Waste Repository so that Radiation Protection after its Closure is optimised with social and economic factors taken into account. A reasonable assurance shall be provided by the Licensee to the Authority and other interested parties that Doses and risks to members of the public in the long-term will not exceed the Dose Constraints or Risk Constraints that were used as Design criteria to meet the performance objectives set forth in Article (4) of this regulation.

### **Emergency Response Arrangements**

#### **Article (11)**

Emergency Preparedness and Emergency Response arrangements commensurate with the hazards shall be established by the Licence applicant and maintained by the Licensee, and shall be reported to the Authority in a timely manner in accordance with FANR Regulation 12 for Emergency Preparedness for Nuclear Facilities (FANR-REG-12).

### **Modifications of a Radioactive Waste Repository**

#### **Article (12)**

1. The Safety of an existing Radioactive Waste Repository shall be assessed and documented in a periodic Safety Assessment report every five (5) years until the termination of the Licence for Operation or as otherwise established by the Authority. During this period, the Safety of the Radioactive Waste Repository shall also be assessed

when a modification is planned or in the event of changes with regard to the conditions of the Licence.

2. The periodic Safety Assessment shall be performed by reviewing and updating the Safety Assessment to ensure that the engineering configuration and operational procedures reflected within it are current. The periodic Safety Assessment shall include (but shall not be limited to) the Assessment of Safety significant modifications, ageing programme, operating experience, applicable current standards, technical developments, organisational and management issues, and changes to the conditions of the Licence within the five-year period.
3. The Licensee shall obtain the written approval of the Authority prior to implementing modifications to any of the following, which may result in significant Safety, security or safeguards implications:
  - a) any Management System and organisational arrangements;
  - b) the Structures, Systems and Components of the Radioactive Waste Repository; or
  - c) any of the application documents submitted by the Licensee.
4. The Licensee may (i) make changes in the Radioactive Waste Repository operations area described in the Licence application, (ii) make changes in the procedures described in the Licence application, and (iii) conduct tests not described in the Licence application without prior approval of the Authority provided that the change or test does not involve any of the modifications set forth in Article (12)(3) above.
5. The Licensee shall maintain records of the changes in the Radioactive Waste Repository operations area and of changes in procedures made pursuant to Article (12) to the extent that such changes constitute changes in the Radioactive Waste Repository operations area or in the procedures described in the Licence application. Records of tests carried out by the Licensee pursuant to Article (12)(3) of this regulation shall also be maintained. These records shall include a written Safety evaluation, which provides the basis to determine that the change or test does not involve any of the modifications set forth in Article (12) of this regulation.

## **Transfer of Licensee Responsibility**

### **Article (13)**

Following Closure and the post-Closure control period of the Radioactive Waste Repository, the Licensee shall apply for an amendment of the Licence for Operation and Closure in order to authorise the transfer of responsibility for Institutional Control to an authority or institution designated under the laws of the State. The amendment shall be granted when the Authority finds that:

- a) the Closure of the Radioactive Waste Repository has been made in conformance with the Licensee's Radioactive Waste Repository Closure plan as amended and approved as part of the Licence for Operation;
- b) reasonable assurance has been provided by the Licensee that the performance objectives set forth in Article (4) of this regulation have been met by the Licensee at the time of issuance of the Licence amendment;
- c) post-Closure control period monitoring provides reasonable assurance that the long-term stability of the Disposal Site and the disposed Radioactive Waste will be

achieved and will eliminate to the extent practicable the need for ongoing active Maintenance of the Disposal Site; and

- d) the authority or institution designated under the laws of the State to assume responsibility for Institutional Control of the Disposal Site is prepared to assume responsibility for Institutional Control and ensure that those requirements set forth in Article (7) of this regulation, which are still applicable in the Institutional Control phase, will be met.

## **Termination of Licence**

### **Article (14)**

1. Following the transfer of responsibility for Institutional Control in accordance with Article (13) of this regulation, the Licensee may apply for termination of the Licence for Operation.
2. A Licence is terminated only when the Authority finds that:
  - a) the Institutional Control requirements set forth in Article (14) of this regulation have been met;
  - b) any additional requirements resulting from new information developed during the post-Closure control period have been met;
  - c) permanent structures or markers warning against intrusion have been installed, and
  - d) the records required by Article (15) of this regulation have been sent to the authority or institution designated under the laws of the State to assume responsibility for Institutional Control of the Disposal Site, and a copy has been sent to the Authority immediately prior to Licence termination.

## **Records and Reports**

### **Article (15)**

1. Each Licensee shall maintain any records and submit any reports in connection with the licensed activities as may be required by the conditions of the Licence or by the regulations of the Authority. The Licensee shall maintain adequate protection against tampering and loss of records.
2. The Licensee shall submit an annual report on disposed Radioactive Waste to the Authority. The report on the disposed Radioactive Waste shall include Waste Package specific data on the waste type, radionuclide content, location within the waste Disposal Unit, and other necessary data.
3. The Licensee shall submit every five (5) years or as otherwise established by the Authority as per Article (12)(1) of this regulation a report of the results of the periodic Safety Assessment to the Authority for review and acceptance.
4. Records that are required by the Authority's regulations or by Licence conditions, periodic Safety Assessments and records of changes in the Radioactive Waste Repository defined in Article (12) of this regulation shall be maintained and retained for a period specified in the Licence conditions. If a retention period is not otherwise specified, these records shall be maintained and transferred to the governmental entities specified in Article (15)(5) of this regulation as a condition of Licence termination.
5. Notwithstanding Article (15)(1) and Article (15)(4) of this regulation, the Licensee shall record the location and the quantities of Radioactive Waste contained in the Radioactive

Waste Repository and transfer these records upon Licence termination to the governmental entities designated by the Authority at the time of Licence termination.

6. Each Licensee authorised to dispose of Radioactive Waste received from other Persons in accordance with this regulation shall submit annual reports to the Authority. Reports shall be submitted by the end of the first quarter of each year for the preceding year.
7. In addition to the requirements above of Article (15), the Licensee shall store or have stored in an electronic record-keeping system a manifest and other information pertaining to the receipt and Disposal of Radioactive Waste.
8. An Integrated Management System shall be applied to all records and reports.