



Regulation

Decommissioning of Facilities (FANR-REG-21)

Version 0

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Definitions

Article (1)

For 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 (i.e. the Law):

As Low As Reasonably Achievable (ALARA)

This term is frequently referred to by its acronym ALARA and stands for the International Commission on Radiological Protection (ICRP) recommendation on the optimisation of Radiation Protection, namely that radiation Doses be kept as low as reasonably achievable, social and economic considerations being taken into account.

Dose Constraint

A prospective and source-related restriction on the individual Dose from a Radiation Source, which provides a basic level of protection for the most highly exposed individuals from a Radiation Source, and serves as an upper bound on the Dose in optimisation of protection for that Radiation Source. 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 should receive from the planned Operation of any controlled Radiation Source.

Deferred Dismantling

After removal of the Nuclear Fuel from the Facility (for nuclear installations), all or part of a Facility containing Radioactive Material is either processed or placed in such a state that it can be put in safe Storage and the Facility maintained until it is subsequently decontaminated and/ or dismantled. Deferred Dismantling may involve early dismantling of some parts of the Facility and early processing of some Radioactive Material and its removal from the Facility, as preparatory steps for safe Storage of the remaining parts of the Facility.

The quantity E defined as a summation of the tissue Equivalent Doses, which is each multiplied by the appropriate tissue weighting factor where H_T is the Equivalent Dose in tissue T and w_T is the Tissue Weighting Factor for tissue T .

$$E = \sum_T w_T \cdot H_T$$

From the definition of Equivalent Dose, it follows that where w_R is the Radiation Weighting Factor for radiation R and $D_{T,R}$ is the average absorbed Dose in the organ or tissue

$$E = \sum_T w_T \sum_R w_R \cdot D_{T,R}$$

Equivalent Dose

The quantity $H_{T,R}$, defined as where $D_{T,R}$ is the Absorbed Dose delivered by radiation type R averaged over a tissue or organ T and w_R is the Radiation Weighting Factor for radiation type R:

$$H_{T,R} = w_R \cdot D_{T,R}$$

When the radiation field is composed of different radiation types with different values of w_R the Equivalent Dose is:

$$H_T = \sum_R w_R \cdot D_{T,R}$$

Immediate Dismantling

Decommissioning actions begin shortly after the permanent shut-down. Equipment, Structures, Systems and Components of a Facility containing Radioactive Material are removed and/ or decontaminated to a level that permits the Facility to be released from Regulatory Control for unrestricted use, or released with restrictions on its future use.

Institutional Control

Control of a Radioactive Waste site by an Authority or institution designated under the laws of the State. This control may be active or passive and may be a factor in the Design of a Nuclear Facility. Most commonly used to describe controls over a repository after Closure or a Facility undergoing Decommissioning. Also refers to the controls placed on a site that has been released from Regulatory Control under the condition of observing specified restrictions on its future use to ensure that these restrictions are met.

Naturally Occurring Radioactive Material (NORM)

Radioactive Material containing no significant amounts of radionuclides other than naturally occurring radionuclides.

Optimisation of Protection and Safety

The process of determining what level of protection and Safety makes exposures, and the probability and magnitude of potential exposures are “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. Optimise, Optimised and Optimising shall be construed accordingly.

Radiation Weighting Factor

The number by which the absorbed Dose in a tissue is multiplied to reflect the relative biological effectiveness of the

radiation in inducing stochastic effects at low Doses, the result being the Equivalent Dose.

The Radiation Weighting Factors published in The 1990 Recommendations of the International Commission on Radiological Protection (ICRP 60) shall be applied until the Authority determines that the revised Radiation Weighting Factors published in The 2007 Recommendations of the International Commission on Radiological Protection (ICRP 103) shall be applied.

Representative Person

An individual receiving a Dose that is representative of more highly-exposed individuals in the population.

Safety Analysis Report (SAR)

The detailed demonstration of the Safety, security and safeguards of a Nuclear Facility presented in the form of an integrated report that presents the necessary and sufficient information in support of the Licence application for authorisation of the Regulated Activity requested.

Structures, Systems and Components (SSCs)

A general term encompassing all the elements of a Facility or Activity, which contributes to protection and Safety except human factors. Structures are the passive elements such as building vessels and shielding. A System comprises several components assembled in such a way as to perform a specific active function and a Component is a discrete element of a system.

Tissue Weighting Factor

The multiplier of the Equivalent Dose to a tissue or organ used for Radiation Protection purposes to account for the different sensitivities of different organs and tissues to the induction of stochastic effects of radiation.

The Tissue Weighting Factors published in The 1990 Recommendations of the International Commission on Radiological Protection (ICRP 60) shall be applied until the Authority determines that the revised Tissue Weighting Factors published in The 2007 Recommendations of the International Commission on Radiological Protection (ICRP 103) shall be applied.

Objective and Scope

Article (2)

1. The objective of this regulation is to establish the Safety requirements for all aspects of planned Facility Decommissioning from the planning, siting and Design of a Facility to the termination of the Licence. This regulation applies to holders of a Licence for Construction for a Facility or Licence for Operation of a Facility and/ or a Licence for Decommissioning issued by the Authority for a Nuclear Facility or other Facility (hereafter a Facility is referring to a Nuclear Facility and other Facility). The requirements of this regulation shall be considered in conjunction with the requirements from other applicable regulations issued by the Authority pursuant to the Law.
2. The clean-up of the areas of land that have become radiologically contaminated during the Operation of a Facility is included as part of the Decommissioning of the Facility.
3. This regulation does not apply to Radioactive Waste Management Facilities or Disposal facilities for Naturally Occurring Radioactive Material (NORM) or for waste from oil and gas processing, but does apply to Facilities designed to process NORM waste. The requirements for the Decommissioning of supporting buildings and services of such facilities can also be found in this regulation.
4. Security and safeguards aspects have to be considered during Decommissioning, but are outside the scope of this regulation. The security of Radioactive Material shall be controlled in accordance with FANR Regulation on Physical Protection for Nuclear Materials and Nuclear Facilities (FANR-REG-08) and FANR Regulation on Security of Radioactive Sources (FANR-REG-23). Nuclear material accountability and control (NMAC) shall be controlled in accordance with FANR Regulation for the System of Accounting for and Control of Nuclear Material and Application of Additional Protocol (FANR-REG-10).

Optimisation of Protection and Safety

Article (3)

1. The Dose limits for the exposure of workers and members of the public shall be applied during Decommissioning in accordance with FANR Regulation for Radiation Dose Limits and Optimisation of Radiation Protection for Nuclear Facilities (FANR-REG-04) or FANR Regulation for Basic Safety Standards for Facilities and Activities involving Ionising Radiation other than in Nuclear Facilities (FANR-REG-24), as applicable. The Radiation Protection of persons who are exposed to radiation as a result of actions related to Decommissioning shall be optimised with due regard to the relevant Dose constraints.
2. In addition to provisions to protect against exposure during planned activities, provisions shall be made during Decommissioning for protection against, and for reduction of, exposure due to an incident. However, if an incident or a particular situation is of such a nature as to warrant remediation or to require confinement of releases of Radioactive Material under Emergency conditions, the Licensee shall submit to the Authority its remediation plan or confinement plan, if applicable, for releases of Radioactive Material after Emergency conditions.

Facility Assessment of Safety

Article (4)

1. A graded approach shall be applied in all aspects of Decommissioning to determine the scope and level of detail for any particular Facility consistent with the magnitude of the possible Radiation risks arising from the Decommissioning.
2. The type of information and the level of detail in the Decommissioning plans and supporting documents including the Safety Assessments shall be commensurate with the type, scale, complexity, status and stage in the lifetime of the Facility and with the hazards associated with the Decommissioning of the Facility.
3. The final Decommissioning plan shall be supported by a Safety Assessment addressing the planned Decommissioning actions and incidents including Accidents that may occur or situations that may arise during Decommissioning.

Responsibilities of the Holder of a Licence for Operation of a Facility

Article (5)

1. The holder of a Licence for Operation of a Facility shall plan for Decommissioning in compliance with the Licence conditions and with the requirements derived from applicable regulations issued by the Authority pursuant to the Law. The holder of a Licence for Operation of a Facility shall be responsible for all aspects of Safety, Radiation Protection and environmental protection during Operation.
2. The responsibilities of the holder of a Licence for Operation of a Facility shall include:
 - a) Selecting a Decommissioning strategy as the basis for preparing and maintaining a Decommissioning plan (the initial and updated Decommissioning plan) throughout the lifetime of the Facility;
 - b) Preparing and submitting an initial Decommissioning plan and its updates for review by the Authority;
 - c) Estimating the cost of Decommissioning actions and providing financial assurances and resources to cover the costs associated with safe Decommissioning including management of the resulting Radioactive Waste;
 - d) Notifying the Authority prior to permanent shut-down of the Facility in accordance with Article 9 of this regulation;
 - e) Ensuring that the Facility is maintained in a safe configuration during the period of transition following permanent shut-down until the approval of the final Decommissioning plan and issuance of a Licence for Decommissioning by the Authority.
 - f) Retaining records and submitting reports as required by the Authority.

Financing of Decommissioning

Article (6)

1. For an application for a Licence for Operation of a Facility, a report shall be provided to the Authority with information indicating how reasonable assurance will be provided that funds will be available to decommission the Facility.

2. Each Licence applicant or holder of a Licence for Operation of a Facility shall submit a Decommissioning report that:
 - a) Contains a cost estimate for Decommissioning the Facility;
 - b) Indicates which method or methods will be used to provide funds for Decommissioning; and
 - c) Provides a description of the means of adjusting the cost estimate periodically over the life of the Facility.
3. Adequate financial resources to cover the costs associated with safe Decommissioning including management of the resulting waste shall be available when necessary.
4. The cost estimate for Decommissioning shall be updated on the basis of the periodic update of the initial Decommissioning plan or on the basis of the final Decommissioning plan. The mechanism used to provide financial assurance shall be consistent with the cost estimate for the Facility and shall be changed if necessary.
5. If financial assurance for the Decommissioning of an existing Facility has not yet been obtained, adequate financial resources shall be put into place as soon as possible. Approval of a renewal or extension of a Licence for Operation of a Facility shall include provisions for financial assurance.
6. In the event of a sudden shut-down of the Facility, provisions shall be put into place to enable use of the financial resources for Decommissioning when they are needed.
7. If the decommissioned Facility is to be released from Regulatory Control with restrictions on its future use, financial assurances shall be such that financial resources are available for monitoring, surveillance and control of the Facility (including Institutional Control) throughout the necessary time period.
8. For Decommissioning activities that delay completion of Decommissioning by including a period of Storage or surveillance, the holder of a Licence for Operation of a Facility shall provide a means of adjusting cost estimates and associated funding levels over the Storage or surveillance period.
9. The holder of a Licence for Operation of a Facility shall pay fees into the Decommissioning Trust Fund, pursuant to the Law, to cover:
 - a) Costs for the Construction, Operation and Closure of a Radioactive Waste Management Facility including costs for any research and development activities essential for this purpose;
 - b) Costs for Decommissioning of the Nuclear Facility;
 - c) Costs for regulatory oversight of the Activities referred to in Article 6, paragraphs 9(a) and 9(b) of this regulation; and
 - d) Costs for the management of the Decommissioning Trust Fund.

Planning of Decommissioning during the Lifetime of the Facility

Article (7)

1. The holder of a Licence for Operation of a Facility shall prepare a Decommissioning plan and shall maintain it throughout the lifetime of the Facility according to the requirements

of the Authority in order to show that Decommissioning can be accomplished safely to meet the defined end state.

2. The holder of a Licence for Operation of a Facility shall take Decommissioning into account in the siting, Design, Construction, Commissioning and Operation of the Facility including features to facilitate Decommissioning, maintenance of records of the Facility, and consideration of physical and procedural methods to limit radiological contamination and/ or activation.
3. At the siting stage, a background survey of the site including information on radiological conditions shall be performed prior to the Construction of a new Facility and the baseline data shall be updated prior to its Commissioning. This information shall be used to determine background radiological conditions. For those Facilities for which no such background survey has been made in the past, data from analogous and undisturbed areas with similar characteristics shall be used instead of pre-operational baseline data.
4. For a new Facility, planning of Decommissioning shall begin early in the Design stage and shall continue until the Licence for Decommissioning has been terminated.
5. The Licence applicant shall prepare an initial Decommissioning plan and submit it to the Authority along with the Licence application to operate the Facility. This initial Decommissioning plan is required in order to identify Decommissioning options to demonstrate the feasibility of Decommissioning, to ensure that sufficient financial resources will be available for Decommissioning, and to identify categories and estimate quantities of waste that will be generated during Decommissioning.
6. The initial Decommissioning plan shall be updated by the holder of a Licence for Operation of a Facility and shall be reviewed by the Authority periodically at least every three years unless otherwise required by the Authority or when specific circumstances warrant or when changes in an operational process require significant changes to the plan. The initial Decommissioning plan shall be updated as necessary in the light of relevant operational experience gained, available lessons learnt from the Decommissioning of similar facilities, new or revised Safety requirements, or technological developments relevant to the selected Decommissioning strategy. If an Accident occurs or a situation arises with consequences relevant for Decommissioning, the initial Decommissioning plan shall be updated by the holder of a Licence for Operation of a Facility as soon as possible and shall be reviewed by the Authority.
7. For existing Facilities where there is no initial Decommissioning plan, a plan for Decommissioning shall be prepared by the holder of a Licence for Operation of a Facility as soon as possible. The plan shall be periodically updated and reviewed as described in Article 7, paragraph 6 of this regulation.
8. If permanent shut-down takes place before a final Decommissioning plan is prepared, such plan shall be prepared as soon as possible and adequate arrangements shall be made to ensure the Safety of the Facility until approval of the final Decommissioning plan.
9. Between the permanent shut-down of Operations at a Facility and approval of the final Decommissioning plan, there may be a period of transition. During this transition period, a Licence for Operation of a Facility shall remain in place unless the Authority has approved amendments to the Licence on the basis of a reduction in the hazards associated with the Facility. During this period, some preparatory actions for Decommissioning can be performed in accordance with the Licence for Operation of the Facility or an amended Licence.

Preparation for Decommissioning

Article (8)

1. A human resources programme shall be developed in order to ensure that sufficient, motivated and qualified personnel are available for the safe Operation of the Facility up to final shut-down; for conducting activities in a safe manner during the preparatory period for Decommissioning; and for safely carrying out the Decommissioning of the Facility.
2. In the preparatory period for Decommissioning, a high level of operational Safety shall be maintained until the Nuclear Fuel has been removed from the Facility.
3. For a multiple reactor Nuclear Facility, appropriate measures shall be put in place to ensure that common systems and common equipment remain fully available to support the safe Operation of all the generating units.
4. The Operator shall be aware over the operating lifetime of the Facility of the needs in relation to future Decommissioning. Experience and knowledge with regard to radiologically contaminated or irradiated Structures, Systems and Components (SSCs) gained in modification and Maintenance activities at the Facility shall be recorded and retained to facilitate the planning of Decommissioning. Complete and reviewed information shall be compiled to be transferred to the organisation responsible for managing the Decommissioning phase.
5. The implications for Safety of the activities in the transitional phase prior to the commencement of Decommissioning shall be assessed and shall be managed so as to avoid undue hazards and to ensure Safety.

Termination of a Licence for Operation of a Facility

Article (9)

1. The holder of a Licence for Operation of a Facility shall inform the Authority about permanent shut-down of a Facility prior to such shut-down. If a Facility is permanently shut down and/ or is no longer used for its intended purpose, an application for a Licence for Decommissioning shall be submitted to the Authority for approval within two years of permanent shut-down, unless an alternative schedule is agreed by the Authority.
2. When a holder of a Licence for Operation of a Facility has decided to permanently cease operations, the holder of a Licence for Operation of a Facility shall, within 30 days from the date of its decision, submit a written certification to the Authority, stating the date on which operations have ceased or will cease.
3. Once Nuclear Fuel has been permanently removed from the reactor vessel, the holder of a Licence for Operation of a Facility shall submit a written certification to the Authority stating the date on which the Nuclear Fuel was removed from the reactor vessel and the disposition of the Nuclear Fuel.
4. Upon receipt by the Authority of the certifications for permanent cessation of operations and permanent removal of Nuclear Fuel from the reactor vessel or upon entry into force of a final legally effective order to permanently cease operations, a Licence for Operation of a Facility will no longer be in force for the Operation of a Facility or for the emplacement of Nuclear Fuel into the reactor vessel or for the retention of Nuclear Fuel in the reactor vessel.

5. The holder of a Licence for Operation of a Facility shall submit an application for termination of a Licence. The application for termination of a Licence shall include or be preceded by a Licence termination plan to be submitted to the Authority for approval according to the following procedure:
 - a) The Licence termination plan shall be a supplement to the Final Safety Analysis Report (FSAR) or equivalent and shall be submitted at least two years before termination of the Licence date.
 - b) The Licence termination plan shall include:
 - i. Site characterisation;
 - ii. Identification of remaining dismantlement activities;
 - iii. Plans for site remediation;
 - iv. Detailed plans for the final radiation survey;
 - v. A description of the end use of the site, if restricted;
 - vi. An updated site-specific estimate of remaining Decommissioning costs;
 - vii. Any new information or significant environmental change associated with the proposed termination activities of the holder of a Licence for Operation of a Facility; and
 - viii. Identification of parts, if any, of the Facility or site that were released for use before approval of the Licence termination plan.

Responsibilities of the holder of a Licence for Decommissioning

Article (10)

1. The holder of a Licence for Decommissioning shall conduct the Decommissioning actions in compliance with the Licence for Decommissioning and with requirements derived from other applicable laws and regulations issued by the Authority pursuant to the Law. The holder of a Licence for Decommissioning shall be responsible for all aspects of Safety, Radiation Protection and environmental protection during Decommissioning.
2. The responsibilities of the holder of a Licence for Decommissioning shall include:
 - a) Submitting a final Decommissioning plan and supporting documents for review and approval by the Authority in accordance with this regulation in order to obtain the Licence for Decommissioning;
 - b) Managing the Decommissioning project and conducting Decommissioning actions or ensuring oversight of the actions conducted by contractors;
 - c) Managing the remaining operational waste from the Facility and all waste from Decommissioning;
 - d) Performing Safety Assessments and environmental impact Assessments in support of Decommissioning actions;
 - e) Preparing and implementing appropriate Safety procedures including Emergency plans;

- f) Ensuring that properly trained, qualified and competent staff are available for the Decommissioning project;
- g) Performing radiological surveys in support of Decommissioning;
- h) Verifying that end state criteria have been met by performing a final survey; and
- i) Retaining records and submitting reports as required by the Authority.

Integrated Management of Decommissioning

Article (11)

1. The holder of a Licence for Decommissioning shall ensure that its integrated Management System covers all aspects of Decommissioning in accordance with FANR Regulation for Management Systems for Nuclear Facilities (FANR-REG-01) and IAEA GS-R-3: The Management System for Facilities and Activities, as applicable.
2. The holder of a Licence for Decommissioning shall establish and implement an integrated Management System in accordance with Article 11, paragraph 1 of this regulation. If the holder of a Licence for Decommissioning changes during the Decommissioning of the Facility, procedures shall be put in place to ensure transfer of responsibilities for Decommissioning to the new holder of a Licence for Decommissioning.

Final Decommissioning Plan

Article (12)

1. Prior to the conduct of Decommissioning actions, a final Decommissioning plan shall be prepared and submitted to the Authority for review and approval. The approved final Decommissioning plan will be a supplement to the Safety Analysis report or equivalent.
2. Licensees shall not perform any major Decommissioning actions until the Authority has issued the Licence for Decommissioning and until certifications of permanent cessation of operations and permanent removal of Nuclear Fuel from the reactor vessel have been submitted to the Authority.
3. The holder of a Licence for Operation of a Facility shall inform the Authority about its intention to have permanent cessation of the Operation within two years prior to shutting down a Facility permanently. If a Facility is permanently shut down and/ or is no longer used for its intended purpose, a final Decommissioning plan shall be submitted to the Authority for approval within two years of permanent shut-down unless an alternative schedule is agreed by the Authority.
4. The final Decommissioning plan and supporting documents shall include the following:

- a) the selected Decommissioning strategy;
 - b) a description of the planned Decommissioning activities;
 - c) the schedule for Decommissioning;
 - d) type and sequence of Decommissioning actions;
 - e) the waste management strategy applied including clearance;
 - f) the proposed end state and how the Decommissioning Licensee will demonstrate that the end state has been achieved;
 - g) the Storage and Disposal of the Decommissioning waste;
 - h) details of the financing for the completion of Decommissioning including the projected cost of managing irradiated fuel, as applicable; and
 - i) the advice that has been sought and analysed of individuals and institutions in the community who may be affected by the Decommissioning, as appropriate.
5. All Decommissioning phases necessary to reach the end state shall be described in the final Decommissioning plan and supporting documents. Updates of the final Decommissioning plan shall include additional information for subsequent phases.
 6. If the final Decommissioning plan or updates to it include new technologies and concepts for Decommissioning actions, the Decommissioning Licensee shall demonstrate prior to their use that the use of such methods is safe and can effectively achieve the desired result.
 7. During the preparation and updating of the final Decommissioning plan, the extent and type of Radioactive Material at the Facility, including activated and radiologically contaminated structures and components, shall be determined by means of a detailed characterisation survey and on the basis of records collected during the operational period. If radiological contamination or Radioactive Waste from operations remains at the Facility (including in sub-surface soils and groundwater) such Radioactive Material shall be included in the characterisation survey. Additional characterisation of the site for the purpose of evaluating and preventing the potential migration of radionuclides shall be considered.
 8. If Deferred Dismantling has been selected as a Decommissioning strategy, the Decommissioning Licensee shall demonstrate in the final Decommissioning plan and supporting documents that such an option will be implemented safely. The availability of adequate financial resources to ensure the Facility is maintained in a safe condition during the deferral period and for subsequent decontamination and/ or dismantling shall be demonstrated.
 9. Updates of the final Decommissioning plan shall be made as necessary in the light of experience gained in Decommissioning, new or revised Safety requirements, or new or revised applicable regulations. Updates of the final Decommissioning plan by the Decommissioning Licensee shall be subject to review by the Authority.

Conduct of Decommissioning Actions

Article (13)

1. The holder of a Licence for Decommissioning shall implement the Authority approved final Decommissioning plan including management of Radioactive Waste in compliance with applicable regulations and the Licence for Decommissioning issued by the Authority for this purpose.
2. In the case of Deferred Dismantling, the holder of a Licence for Decommissioning shall ensure that the Facility is maintained in a safe configuration so that subsequent decontamination and/ or dismantling can be performed. An adequate programme for Maintenance, monitoring and surveillance, which shall be subject to approval by the Authority, shall be developed to ensure Safety throughout the period of deferral.
3. Decommissioning will be completed within 60 years of permanent cessation of operations. Completion of Decommissioning beyond 60 years will be approved by the Authority only when necessary to protect public health and Safety. Factors that will be considered by the Authority in evaluating an alternative that provides for completion of Decommissioning beyond 60 years of permanent cessation of operations include unavailability of waste Disposal capacity and other site-specific factors affecting the Decommissioning Licensee's capability to carry out Decommissioning including the presence of other Nuclear Facilities at the site.
4. In accordance with the final Decommissioning plan, Decommissioning techniques shall be selected such that the protection of workers, the public and the environment are optimised; the generation of waste is minimised; and the potential negative impact on Storage and Disposal of waste is minimised by, inter alia, avoiding the use of decontamination techniques that may result in increased mobility of the radionuclides in the waste. As Decommissioning actions progress such as decontamination, cutting and handling of large components, new hazards may arise. The impact of these actions on Safety shall be assessed and managed so that the potential consequences of such new hazards are prevented and/ or detected, and mitigated.
5. During Decommissioning, the Decommissioning Licensee shall keep updated the list of Structures, Systems and Components (SSCs) important to Safety. Such Structures, Systems and Components can progressively be de-classified and dismantled as the Decommissioning progresses, provided that the Facility's Inspection and Maintenance programme is updated accordingly.

Emergency Response Arrangements

Article (14)

1. Emergency preparedness and response arrangements commensurate with the hazards shall be established and maintained and events important to Safety shall be reported to the Authority in a timely manner in accordance with the requirements in FANR Regulation for Emergency Preparedness for Nuclear Facilities (FANR-REG-12) and FANR Regulation for Basic Safety Standards for Facilities and Activities involving Ionizing Radiation other than in Nuclear Facilities (FANR-REG-24) for nuclear and radiological emergencies respectively.
2. For Nuclear Facilities, the Decommissioning Licensee shall revise the Emergency Plan to be commensurate with the hazards during Decommissioning as described in Article 8 of FANR Regulation for Emergency Preparedness for Nuclear Facilities (FANR-REG-12) and submit it to the Authority for approval.

Radioactive Waste Management

Article (15)

1. Radioactive Waste arising from operational activities that remains at the Facility and Radioactive Waste that is generated during Decommissioning shall be disposed of in accordance with requirements as stipulated by the Authority. If Disposal capacity is not available, Radioactive Waste shall be stored safely in accordance with the FANR Regulation for Pre-disposal Management of Radioactive Waste (FANR-REG-26) and FANR Regulation for Radiation Protection and Predisposal Radioactive Waste Management in Nuclear Facilities (FANR-REG-11) or FANR Regulation on Basic Safety Standards for Facilities and Activities involving Ionising Radiation other than in Nuclear Facilities (FANR-REG-24), as applicable.
2. Prior to starting Decommissioning, the Decommissioning Licensee shall ensure the availability of adequate Processing and Storage capabilities and transport packages for the Radioactive Waste.
3. The Decommissioning Licensee shall ensure traceability for all waste generated during Decommissioning. The Decommissioning Licensee shall maintain up-to-date records of the waste generated, stored in the Facility or transferred to another authorised licensed Facility, and shall specify the quantity, characteristics, treatment methods and destination of the waste in the said records.
4. If operational Radioactive Waste or Nuclear Fuel is present in the Facility after its permanent shut-down, such material shall be removed prior to Decommissioning and shall be transported to a licensed Facility in compliance with the FANR Regulation for the Safe Transport of Radioactive Materials (FANR-REG-13) and FANR Regulation for the System of Accounting for and Control of Nuclear Material and Application of Additional Protocol (FANR-REG-10). In case such removal is not possible during the period of transition between permanent shut-down and the receipt of the Licence for Decommissioning, the approved final Decommissioning plan shall address the removal of these materials as part of Decommissioning (during initial phases of Immediate Dismantling or during the preparatory phase for safe Storage). In both cases, the management of such material shall be carried out in accordance with FANR Regulation for the System of Accounting for and Control of Nuclear Material and Application of Additional Protocol (FANR-REG-10), FANR Regulation for Pre-disposal Management of Radioactive Waste (FANR-REG-26) and FANR Regulation for Radiation Protection and Predisposal Radioactive Waste Management in Nuclear Facilities (FANR-REG-11) or FANR Regulation on Basic Safety Standards for Facilities and Activities involving Ionizing Radiation other than in Nuclear Facilities (FANR-REG-24), as applicable.

Completion of Decommissioning Actions and Termination of the Licence for Decommissioning

Article (16)

1. On the completion of Decommissioning actions, the holder of a Licence for Decommissioning shall demonstrate that the end state criteria as specified in the final Decommissioning plan and Article 17 requirements of this regulation have been met.
2. A final Decommissioning report shall be prepared by the holder of a Licence for Decommissioning to demonstrate that the end state of the Facility as specified in the

approved final Decommissioning plan has been reached. This report shall be submitted to the Authority for review and approval.

3. If the approved Decommissioning end state is released from Regulatory Control with restrictions on the future use of the remaining structures, appropriate controls and programmes for monitoring and surveillance shall be established and maintained to ensure Safety and optimisation of protection of the public and the environment. These controls shall be subject to approval by the Authority. Responsibility for implementing and maintaining these controls and programmes shall be clearly assigned. The Authority shall ensure that a mechanism is put in place to ensure compliance with the restrictions on the future use of the Facility and/or site.
4. If Radioactive Waste is stored on the site after Decommissioning has been completed, a Licence amendment for the waste Storage Facility shall be sought from the Authority. The amended Licence shall include requirements for Decommissioning of the Storage Facility.
5. In the case of the release of part of the site from Regulatory Control, a Licence amendment for the remainder of the site remaining under Regulatory Control shall be sought from the Authority, as appropriate.
6. The Authority shall terminate a Licence for Decommissioning of a Nuclear Facility when the following conditions are met:
 - a) The Decommissioning has been performed in accordance with the approved final Decommissioning plan, and
 - b) The final radiation survey and associated documentation demonstrate that the Facility and site have met the criteria for Decommissioning in Article 17 of this regulation.
7. The Authority shall decide on Termination of the Licence for Decommissioning of other Facilities when the following conditions are met:
 - a) A Licensee that permanently ceases operations shall apply to the Authority to have the Licence for Decommissioning terminated within two years following permanent cessation of operations, and in no case later than one year prior to expiration of the Licence for Decommissioning. Each application for termination of a Licence for Decommissioning shall be accompanied or preceded by a proposed Decommissioning plan. The contents of the Decommissioning plan are specified in Article 12, paragraph 4 of this regulation.
 - b) The Authority has determined that:
 - i. the Decommissioning has been performed in accordance with the approved Decommissioning plan, and
 - ii. the radiation survey carried out for the termination of the Licence and associated documentation demonstrate that the Facility and site are suitable for release from Regulatory Control in accordance with the criteria in Article 17 of this regulation.

Radiological Criteria for Decommissioning Licence Termination

Article (17)

1. A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in an Effective Dose to a

Representative Person that does not exceed 0.3 mSv per year (including that from groundwater sources of drinking water) and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). Determination of the levels that are ALARA shall take into account any detrimental effect from transportation accidents arising during decontamination and waste Disposal activities.

2. A site will be considered acceptable for termination of the Licence for Decommissioning under restricted conditions if:
 - a) The holder of a Licence for Decommissioning can demonstrate that further reductions in residual radioactivity necessary to comply with the provisions of Article 17, paragraph 1 of this regulation, would result in net public or environmental harm or were not being made because the residual levels associated with restricted conditions are ALARA. Determination of the levels that are ALARA shall take into account any detrimental effect from transportation accidents arising during decontamination and waste Disposal activities;
 - b) The holder of a Licence for Decommissioning has made provisions for legally enforceable Institutional Control that provides reasonable assurance that the Effective Dose from residual radioactivity distinguishable from background to a Representative Person will not exceed 0.3 mSv per year;
 - c) The holder of a Licence for Decommissioning has provided sufficient financial assurance to enable an independent third party including a governmental custodian of a site to assume and carry out responsibilities for any necessary control and Maintenance of the site, and
 - d) Residual radioactivity at the site has been reduced so that if the Institutional Controls were no longer in effect, there would be reasonable assurance that the Effective Dose from residual radioactivity distinguishable from background radioactivity to a Representative Person is ALARA and would not exceed either:
 - i. 1 mSv per year; or
 - ii. 5 mSv per year provided that the holder of a Licence for Decommissioning:
 - a) Demonstrates that further reductions in residual radioactivity necessary to comply with the 1 mSv/y value envisaged in paragraph 2(d)i of Article 17 of this regulation are not technically achievable, would be prohibitively expensive, or would result in net public or environmental harm;
 - b) Makes provisions for durable Institutional Controls; and
 - c) Provides sufficient financial assurance to enable a government entity or independent third party, if applicable, and a governmental custodian of a site to carry out periodic verifications on the site at least one time in five years to assure that the Institutional Controls remain in place and in compliance with paragraph 2(b) of Article 17 of this regulation and to assume and carry out responsibilities for any necessary control and maintenance of those controls.

Reporting and Record-keeping for Decommissioning

Article (18)

1. Each holder of a Licence for Operation of a Nuclear Facility shall report to the Authority at least once every three years on the status of its Decommissioning funding for each reactor under its Licence for Operation. The information in such report shall include, at a minimum, the following items:
 - a) an estimate of the amount of Decommissioning funds to be required for Decommissioning of the Nuclear Facility;
 - b) an estimate of the amount of Decommissioning funds accumulated at the end of the calendar year preceding the date of the report;
 - c) a schedule of the annual amounts remaining to be collected;
 - d) the assumptions used regarding rates of escalation in Decommissioning costs, rates of earnings on Decommissioning funds, and rates of other factors used in funding projections;
 - e) any contracts upon which the holder of a Licence for Operation is reliant upon for uncollected funds that are estimated to be needed for Decommissioning;
 - f) any modifications occurring to the current method of providing financial assurance from the holder of a Licence for Operation since the last submitted report; and
 - g) any material changes to financial agreements.

If any of the preceding items is not applicable, the holder of a Licence for Operation should state so in its report. Where a Facility that is within five years of the projected end of its Operation or where conditions have changed such that the Facility will close within five years (before the end of its licensed life) or has already closed (before the end of its licensed life) or is involved in a merger or an acquisition, the holder of the Licence for Operation of said Facility shall submit this report to the Authority on an annual basis.

2. Each holder of a Licence for Operation of a Nuclear Facility shall at or about five years prior to the projected end of operations submit to the Authority a preliminary Decommissioning cost estimate, which includes an up-to-date Assessment of the major factors that could affect the cost of Decommissioning.
3. Each holder of a Licence for Operation of other Facility shall at or about two years prior to the projected end of operations submit to the Authority a final Decommissioning plan containing a cost estimate for Decommissioning and an up-to-date Assessment of the major factors that could affect planning for Decommissioning.
4. Each holder of a Licence for Operation of a Facility shall keep records of information important to the safe and effective Decommissioning of the Facility in an identified location to be transferred to the holder of a Licence for Decommissioning. If records of relevant information are kept for other purposes, reference to these records and their locations may be used. Information that the Authority considers important to Decommissioning consists of:

- a) Records of spills or other unusual occurrences involving the spread of radiological contamination in and around the Facility, equipment or site. These records may be limited to instances when significant radiological contamination remains after any clean-up procedures or when there is a reasonable likelihood that contaminants may have spread to inaccessible areas as in the case of possible seepage into porous materials such as concrete. These records shall include any known information on identification of involved nuclides, quantities, forms and concentrations.
 - b) As-built drawings and modifications of structures and equipment in restricted areas where Radioactive Material is used and/ or stored and of locations of possible inaccessible radiological contamination such as buried pipes, which may be subject to radiological contamination. If required drawings are referenced, each relevant document need not to be indexed individually. If drawings are not available, the holder of a Licence for Operation of a Facility shall substitute appropriate records of available information concerning these areas and locations.
 - c) Records of the cost estimate performed for the Decommissioning funding plan or of the amount certified for Decommissioning, and records of the funding method used for assuring funds if either a funding plan or certification is used.
 - d) Records of the following:
 - i. The licensed site area, as originally licensed, which shall include a site map and any record of acquisition or use of property outside the originally licensed site area for the purpose of receiving, possessing or using licensed Radioactive Materials;
 - ii. The licensed activities carried out on the acquired or used property.
5. Each holder of a Licence for Decommissioning shall maintain the following records of:
- a) the release from Regulatory Control and final disposition of any property recorded in accordance with paragraph 4(d)i of Article 18 of this regulation,
 - b) the historical site Assessment performed for the release from Regulatory Control,
 - c) radiation surveys performed to support release of the property, and
 - d) the methods employed to ensure that the property met the radiological criteria of Article 17 of this regulation, at the time the property was released.