

**REGULATION ON SAFETY
DURING DECOMMISSIONING OF NUCLEAR FACILITIES**

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CHAPTER I

General Provisions

Article 1.

This Regulation sets the basic issues of safety during decommissioning of nuclear facilities, ensuing from the specifics of the activities during decommissioning.

Article 2.

This Regulation shall be applied to all entities that design, construct, commission, operate and decommission nuclear facilities.

Article 3.

- (1) Decommissioning shall be executed in a way that ensures the radiation protection and the safety of the personnel and the population as well as the protection of the future generations from the harmful effect of ionising radiation.
- (2) Radiation protection during decommissioning of nuclear facilities shall be ensured through observance of the principles of radiation protection, as specified in the Regulation pertaining to Article 26, para 3 of the Act on the Safe Use of Nuclear Energy (ASUNE).

Article 4.

- (1) Decommissioning of a nuclear facility after the stage of final termination of its operation aims at the removal from the site of the nuclear facility of the sources of ionising radiation, subject of regulatory control
- (2) The final target of the nuclear facilities decommissioning is the complete and final clearance of the site from SIR, including possibility for future use of the site for industrial and/or other purposes.

Article 5.

The final target pursuant to Art. 4, Paragraph 2, may be changed in the case when:

1. certain part of the nuclear facility under decommissioning is joined to another existing and operating nuclear facility;
2. parts of the nuclear facilities under decommissioning are used for management of radioactive waste;
3. a new nuclear facility is constructed on the site where the nuclear facility is being decommissioned;
4. conditions exist for violation of the requirements and criteria for safety of the personnel, population and the environment.

CHAPTER II

PLANNING OF SAFE DECOMMISSIONING

SECTION I

Initial and Intermediate Planning And Targets

Article 6.

Holder of a permit or a license for site selection, design, construction, commissioning and operation of a nuclear facility shall develop initial and intermediate concepts and plans its decommissioning.

Article 7.

(1) During site selection, design and construction of a nuclear facility an initial concept and plan shall be developed in accordance with the provisions of Article 40, para 1, item 1, point “a” of the Regulation on the Procedure for Issuance of Licenses and Permits for Safe Use of the Nuclear Energy (SG No. 41 from 2004). The concept shall consider and substantiate the following technical measures and solutions that facilitate decommissioning:

1. appropriate lay-out of the structures, systems and components of the nuclear facilities, including suitable positioning of the facilities for decontamination, handling and remote operations, that facilitates dismantling and transportation operations.
2. structural materials, structures and systems shall be selected and designed in such a way as to ensure ease of decontamination, decreasing to the possible minimum

of the radioactive contamination and spreading of radioactive products, of the amounts of generated RAW including those during decommissioning.

- (2) The concept pursuant to Paragraph 1 should contain preliminary analyses and assessments of the effect of decommissioning of the nuclear facility on the population and the environment.
- (3) In order to substantiate prompt provision of finances for decommissioning activities of the nuclear facilities, the concept pursuant to Paragraph 1 must contain:
 1. preliminary assessment for the necessary financial means, determined on the basis of applied and accepted methods and technologies for decommissioning of nuclear facilities and methods for cost- benefit analyses.
 2. the ways and the means for provision of the necessary funding based on legislation in force in this field.

Article 8.

During the operation period the licensee shall ensure the implementation of the following basic measures facilitating the decommissioning activities:

1. provision of the minimum possible radioactive contamination and spread of radioactive substances in the structures, systems and components of the nuclear facility;
2. prompt processing, classification, storage, accounting and documentation of the RAW generated during operation (pursuant to the Regulation on Safety of Radioactive Waste Management);
3. performance of periodic analyses and calculations for the available and forecasted amounts and volumes of RAW as a result of normal operation and future decommissioning of the nuclear facilities;
4. updating and optimisation of the organisational and technical measures for RAW management.

Article 9.

The licensee for operation of the nuclear facility shall develop within the intermediate safety analysis report on the stage of design permit intermediate concept and plan for decommissioning of the facility.

SECTION II

Determination of a concept and development of a decommissioning plan

Article 10.

- (1) The process of decommissioning of a nuclear facility shall be based on decommissioning concept, which shall serve as a basis for selection and substantiation of optimum and safe option for execution of the main activities and the stages for their implementation during the period of decommissioning.
- (2) The concept and the selected decommissioning option shall be developed, substantiated and presented by the applicant for decommissioning permit as part of the decommissioning plan of the nuclear facility.
- (3) During the decommissioning of a nuclear facility the following conceptual and technical options are possible:
 1. immediate dismantling, including removal of radioactive facilities, materials and structures from the site followed by release of the site for restricted or unrestricted use;
 2. safe enclosure of the nuclear facility in the case of deferred dismantling for a technically and financially substantiated period of time; the following sub-options are deemed acceptable in the case of safe enclosure:
 - a/ active option, where the personnel have access to nuclear facility during the normal working hours;
 - b/ passive option, where normally the facility is not accessible and only periodical attendance is provided for monitoring and assessment of the state and the conditions of the facility;

Article 11.

- (1) The complete process of decommissioning of nuclear facility shall be developed, analysed, planned and substantiated in the general decommissioning plan.
- (2) The general decommissioning plan of a nuclear facility shall be developed based on:
 1. the developed safety analysis report;
 2. the experience, results, documents and data obtained during the intermediate planning;
 3. the results from the performed analysis, studies and projects, connected with decommissioning of the nuclear facility, including the environmental impact assessment pursuant to the Act on Environmental Protection;

4. documents pursuant to Article 15.

Article 12.

The decommissioning plan pursuant to Article 11, Paragraph 1, shall be developed and implemented in accordance with the requirements of Article 15 and Article 15, Paragraph 1, of the Regulation on the Procedure for Issuance of Licenses and Permits for Safe Use of the Nuclear Energy.

SECTION III

Planning and Substantiation of Safety during Decommissioning

Article 13.

- (1) Activities for decommissioning of a nuclear facility shall be carried out in accordance with the issued decommissioning permit and in implementation of the plan, pursuant to Article 11, Paragraph 11, which examines and substantiates implementation of the activities stipulated for the given stage and measures for their safe fulfilment.
- (2) Where decommissioning activities are executed on stages the plan for the given stage shall include a short description of the carried out activities and obtained results during the preceding stages of decommissioning of the nuclear facility, as well as the possible changes in the volume, technologies and deadlines for implementation of the stages and activities envisaged in the general decommissioning plan, which have appeared due to new circumstances and/or progress in technologies.

CHAPTER III

GENERAL REQUIREMENTS FOR SAFETY DURING DECOMMISSIONING

SECTION I

Maintenance of Safety-Significant Systems and Equipment

Article 14.

- (1) During all stages of decommissioning of nuclear facility the permit holder shall provide for maintenance of physical barriers and levels of protection in a state assuring the safety of the nuclear facility.
- (2) The technical state, reliability and the operating modes of the safety-significant systems and equipment must ensure safe implementation of all activities and safe state of the nuclear facility under decommissioning pursuant to and for the execution of the technical specifications for the given stage.

Article 15.

- (1) Implementation of the requirements pursuant to the Art. 14 shall be assured through the respective analyses and substantiations, which are presented as a part of the safety analysis report pursuant to Article 60, Item 1 and Article 61, Paragraph 2, Item 5 of the Regulation for the Procedure for Issuance of Licenses and Permits for Safe Use of the Nuclear Energy .
- (2) Analyses and substantiation pursuant to the Paragraph 1 shall examine and justify the availability, technical state, operational resource and preparedness for performance of the existing safety-significant systems and equipment. The analyses shall determine and justify the necessity in additional measures, such as repairs and reconstruction and/or construction of additional safety systems in accordance with specific technologies and activities of decommissioning, envisaged for the respective stage.
- (3) Based on analyses, pursuant to Paragraph 2, organizational end technical measures for defence in depth shall be determined, when necessary.

Article 16.

- (1) Analyses and assessments for accounting of the fulfilment of the functions, the technical state and the necessity in further use and operation of all or part of the existing safety-significant systems and equipment are carried out at the end of each stage of decommissioning of the nuclear facility.
- (2) The main analyses and assessments pursuant to Paragraph 1 are submitted as a part of the content of the final report for evaluation of safety upon completion of a stage pursuant to Annex No. 3.

SECTION II

Decontamination and Dismantling of Facilities

Article 17.

Decontamination of facilities in the process of decommissioning of a nuclear facility aims at:

1. decreasing to the possible minimum of the radiation effect on the personnel, the population and the environment during the activities within the period of decommissioning;

2. decreasing the quantities and types of radioactive materials and substances, subject to treatment, control, keeping and storage such as RAW.
3. increasing the possibilities for recycling and use of facilities, materials, premises and parts of the site, including exemption from the radiation control.

Article 18.

The selection of decontamination technologies shall be carried out on the basis of proven by practice technologies through analyses and evaluations of their efficiency. Analyses shall be based on:

1. current state of radioactive contamination of facilities or structures and justification for reaching the planned levels and indicators after the decontamination;
2. analyses and determination of the types and quantities of RAW generated as a result of decontamination and possibilities for their treatment, keeping and storage;
3. assessments for the expected exposure doses of the personnel and measures for non-exceeding of the determined basic exposure limits;
4. eventual harmful effects of the selected technology in order to decrease them to the possible minimum;
5. assessment of the economic efficiency of decontamination, necessary means and expected benefits.

Article 19.

(1) Methods, technologies and the sequence of dismantling of structures, systems and components of the nuclear facility during different stages of decommissioning shall be determined and updated by analyses and assessments, taking into account the following:

1. developed concept and the general plan for decommissioning;
2. achieved results during dismantling in the previous stages of decommissioning and the accumulated experience during dismantling;
3. progress of the methods and technologies for dismantling and their applicability to the envisaged dismantling activities;
4. actual physical and technical state of the structures, systems and components, including their consideration as SIR and possible radioactive contamination;

5. cost - benefit analyses for the necessary means and expected benefits.
- (2) Deferring the terms for dismantling of structures and components in the case of safe enclosure pursuant to Article 10, Paragraph 2, Item 2, aiming at decreasing their radioactivity level shall be justified through analyses and assessments of the expected decreasing of:
1. quantities of generated RAW, including the necessary volumes of facilities and the respective measures for their safe storage;
 2. possible radiation effects on the personnel;
 3. necessary measures for assuring radiation protection during implementation of dismantling activities;
 4. risk from eventual radiation effects onto the site, population and environment.

SECTION III

Radiation Protection and RAW Management

Article 20.

Radiation protection measures during decommissioning of a nuclear facility shall be performed in accordance with the requirements, the principles and the norms for radiation protection as specified in the Regulation pursuant to Article 26, Paragraph 3 of ASUNE.

Article 21.

- (1) In order to assure radiation protection during the decommissioning activities of a nuclear facility, the holder of the license or permit shall develop, as part of the stage decommissioning plan pursuant to Article 11, Paragraph 1, concept and programmes for radiation protection of the personnel, the population and the environment.
- (2) The concept and the programmes pursuant to Paragraph 1 shall contain:
 1. measures ensuring that the exposure of the personnel and the population will not exceed the prescribed limits;
 2. separation of the facility into areas according to its radiological characteristics and updating of these areas in the process of its decommissioning activities;
 3. forecasts of the exposure doses of the personnel and development and justification of a system for limitation of the doses as basis for planning of technical and organisational measures for radiation protection;
 4. radiological monitoring and surveillance of the site of the facility and the environment;

5. monitoring and recording of the measurements results for the gaseous/aerosol and liquid effluents, the ionising radiation exposure dose rates, the radioactive contamination and the personnel exposure;
6. list of protective means and equipment for radiation protection of the personnel;
7. list of technical means for measurement of radiation parameters;
8. methods and means for decontamination of equipment and structures;
9. measures for control of RAW management;
10. specific requirements for quality assurance;
11. personnel training for meeting the specific requirements for radiation protection during decommissioning.

Article 22.

- (1) Management of RAW generated during nuclear facility decommissioning shall be performed in accordance to the legislation on RAW management.
- (2) The holder of decommissioning permit shall provide appropriate organisation and means for safe management of waste on the site of the facility.

Article 23.

- (1) During decommissioning of the nuclear facility the principles and methods of RAW management used during the facility operation shall be applied, taking into account the following:
 1. application of technologies, design solutions and techniques, leading to decrease of secondary RAW generation to the possible minimum, such as decontamination, sorting and conditioning of waste;
 2. availability of suitable RAW management technologies and transportation capabilities;
 3. availability of sufficient storage facilities or repositories for RAW; the places for the disposal of waste must be indicated in the decommissioning plans.
- (2) Execution of dismantling activities aiming at the decrease the quantities of solid RAW must be justified when it leads to increase of the generated amounts of liquid and gaseous RAW.
- (3) Removal of the physical barriers of the nuclear facility, limiting spreading of radioactive substances into the environment, is performed only under the condition

that liquid and gaseous effluents will not exceed the prescribed values for allowable effluents during the period of decommissioning activities.

Article 24.

In the management of RAW from decommissioning the following issues shall be analysed and accounted:

1. the sources, quantity, category and nature of waste that will be generated during decommissioning;
2. generation of secondary RAW and their decreasing to the possible minimum (secondary RAW are those which are generated additionally as a result of RAW handling);
3. presence of other hazardous materials;
4. possibilities for exemption of RAW from the control of the Regulatory Body;
5. possibilities for re-use and recycling of materials, facilities and buildings;
6. availability of enterprises for recycling or treatment of waste, facilities for storage and disposal sites;
7. requirements for packaging and transport of RAW;
8. potential effect of RAW on the personnel, the population and environment.

Article 25.

The holder of the permission for decommissioning shall develop a concept and programmes for RAW management within the framework of the decommissioning plan of the nuclear facility, which includes:

1. criteria for separation of the waste into different categories;
2. criteria for re-use with or without limitations of the facilities or materials obtained from decommissioning;
3. assessment of sources, quantities and categories of RAW, their physical and chemical characteristics and the volume of each waste category, including the rate of their generation;
4. plans and procedures for treatment, conditioning, transportation, storage and disposal of RAW;
5. methods for decreasing to the possible minimum of the generated RAW and decreasing of secondary RAW quantity;

6. procedures for radiation control and for taking and analysing samples, including those prior to the exemption from the regulatory control.

SECTION IV

Accomplishment of a decommissioning stage

Article 26.

- (1) Upon completion of each decommissioning stage, the permit holder shall develop and submit to the Regulatory Body an updated safety report.
- (2) The report for safety assessment pursuant to Paragraph 1 shall be developed pursuant to the proposed structure and contents (Annex No. 3).

CHAPTER IV

MANAGEMENT OF ACTIVITIES DURING DECOMMISSIONING

SECTION I

Organisation and Control

Article 27.

- (1) The holder of the decommissioning permit bears the responsibility for the necessary organisation, management and safe implementation of decommissioning activities of the nuclear facility.
- (2) The permit holder shall provide clear allocation and separation of the functions and responsibilities among its own personnel and the personnel of other organisations and subcontractors, to which decommissioning activities have been assigned.

Article 28.

- (1) In order to meet the requirements of Art. 26 the permit holder shall develop and present in the decommissioning plan the respective organisational structure, ensuring complete and safe fulfilment of decommissioning activities.
- (2) Measures for independent control of the compliance with the requirements and criteria and for quality evaluation shall be envisaged in the organisational structure pursuant to Paragraph 1.

SECTION II

Qualification and training of the personnel

Article 29.

The decommissioning permit holder shall provide the necessary qualified and specialised personnel for management, execution and control of activities on safe decommissioning of the nuclear facility.

Article 30.

(1) Specialised training of the supervising and the executing staff shall be held in the following areas:

1. rules, requirements and criteria for nuclear, technical and radiation safety, including their implementation and justification during planning and preparation of the necessary documents for obtaining a permit;
2. acquaintance with the structures, systems and components of the nuclear facility, including the operation history and decommissioning;
3. acquaintance with the specific technologies, applied in the decommissioning process, such as dismantling and demolition of facilities and structures, decontamination methods and technologies, remote control operations, robot applications for handling, etc.;
4. engineering and technical support of the processes and activities;
5. quality assurance and control in implementation of the QA programme;
6. management of radioactive and conventional waste;
7. emergency planning;
8. management of the project implementation and the decommissioning activities;
9. training in the case when new or specific technologies and equipment is used.

(2) Basic requirements and programmes for specialised training of the management staff shall be presented in the stage decommissioning plans.

SECTION III

Emergency planning and physical protection

Article 31.

(1) For issuance of permit for decommissioning of the nuclear facility the applicant shall develop an internal emergency preparedness and action plan for protection of the personnel, the population and the environment in case of radiation accident.

- (2) The internal emergency plan pursuant to Paragraph 1 is developed based on analyses of the possible accidents and their consequences taking into account the current state of the nuclear facility and the status of safety-significant systems and equipment as well as the envisaged in the decommissioning plan activities and technical and organisational measures for safety assurance.
- (3) The emergency plan pursuant to Paragraph 1 shall be developed under the conditions and following the procedures defined in the Regulation pursuant to the ASUNE, Article 123.

SECTION IV

Quality assurance and record keeping

Article 33.

The holder of the decommissioning permit shall develop a quality assurance programme as an integral part of the decommissioning plan.

Article 34.

- (1) During the design, construction, commissioning, operation and decommissioning the holder of the respective permit or license shall collect, process, distribute and store the documents and information linked to planning and implementation of the decommissioning activities.
- (2) The documents and information pursuant to Paragraph 1 shall cover the following main areas:
 1. documentation and data for changes in the state and conditions on the site of the nuclear facility;
 2. complete design documentation and the respective design changes, relating to reconstructions and modernisations of the facility during its operation or to decommissioning activities;
 3. results from engineering and technical investigations, tests and expert opinions for the functional state of the structures, systems and facilities;
 4. reports on the state of the nuclear material, its location and the condition of the nuclear material storage facilities;
 5. information on the types and quantities of radioactive and other hazardous waste and substances, the places of their location and/or storage;

6. list of systems, facilities and components, which are sources of ionising radiation and their radiological characteristics;
 7. documentation and data for the state and maintenance or decommissioning activities and dismantling of safety-significant systems and equipment, etc.
- (3) Documentation pursuant to Paragraph 2 shall be submitted to the holder of decommissioning permit who shall store them accordingly.

Article 35.

The order for collecting, processing and storage of the documents and the information shall be determined in the quality assurance programme .

Pursuant to Article 33

Article 36.

- (1) The holder of decommissioning permit shall ensure the storage of documentation and information in accordance with the requirements defined in the permit conditions and in compliance with the applicable regulations.
- (2) During planning and implementation of decommissioning activities the permit holder shall ensure that up-to-date information and documentation is used.

ADDITIONAL PROVISION

Paragraph 1.

In the meaning of this Regulation:

1. “Decommissioning plan” means the description and justification of the adopted concept, the planned activities and the administrative, organisational and technical measures for safety during decommissioning of the nuclear facility.
2. “Decontamination” means complete or partial removal of radioactive contamination from surfaces or media (liquid, or gaseous) using physical or chemical processes.
3. “Levels of protection” mean a system of organisational and technical measures for defence in depth, providing radiation protection and safety during decommissioning activities of the nuclear facility which includes: conservative design, quality assurance and safety culture; prevention of violations and detection of failures; availability of respective safety and protection systems; management of possible accidents; off- site emergency measures.

4. “Physical barriers” mean the boundaries of the nuclear facility, of the primary circuit and/or confinement safety systems of a nuclear reactor. During decommissioning of the facility the physical barriers perform entirely their radiation protection and safety functions under the considered initiating events and under failures independent from the initial events, determined on the basis of the respective analyses and substantiation.
5. “Stage” means a period of time for which a complex of decommissioning-related activities is planned and during which those activities are implemented.

TRANSITIONAL AND FINAL PROVISIONS

Paragraph 2.

This Regulation revokes Regulation No. 10 from 2001 for Safety during Decommissioning of Nuclear Facilities (State Gazette No. 12 from 2001)

Paragraph 3.

Entities which have violated this Regulation are liable pursuant to Chapter XI of the Act for the Safe Use of Nuclear Energy Art. or pursuant to 31 of the Act on Administrative Offences and Penalties if they are not liable to more severe penalties.

Paragraph 4.

Time terms and the scope for establishment of compliance with this Regulation in the case of nuclear facilities in operation and under construction shall be determined for each separate case upon a proposal by the interested legal entities.

Paragraph 5.

This Regulation is issued on the basis of Art. 26, Paragraph 2 of the Act for Safe Use of Nuclear Energy.