Radiation and Nuclear Safety Authority Regulation on Radiological Monitoring of the Environment of Nuclear Facilities

Content

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In accordance with the Radiation and Nuclear Safety Authority's decision, it is issued, by virtue of Section x, Subsection x of the Nuclear Energy Act (x/x):

1 § Scope of application

This regulation shall apply to the environmental radiation monitoring of nuclear facilities. A separate regulation is issued on environmental radiation monitoring of nuclear fuel recovery facilities.

2 § Definitions

For the purposes of this regulation:

1) Environmental baseline shall refer to the radiation conditions and concentrations of radioactive substances in the environment of a nuclear facility before they have been affected by the construction or operation of the nuclear facility.

2) *Environment baseline study* shall refer to a study conducted in the environment of a nuclear facility to determine the baseline environmental conditions in the vicinity of the nuclear facility by means of radiation measurements and identification of radioactive substances.

3) *Emission potential* shall refer to emission potential defined in Regulation Y/X/20XX, Section y.

3 § Identification of monitoring items and planning of the baseline study

SYT-5057 - Before determining the baseline environmental conditions, the environment of the nuclear facility shall be studied and the items applicable for environmental radiation monitoring shall be determined. The items selected for monitoring should provide a comprehensive picture of the environment baseline of the nuclear facility.

SYT-5063 - Based on the identification, the measures necessary for the environmental baseline study shall be determined.

SYT-5064 - When planning the baseline assessment of the environment, the following shall be defined and documented:

1. planned sampling and measurement locations along with justifications
2. the samples and measurements included in the environmental baseline study along with

their timing and frequency
3. descriptions of the measurement methods used and their suitability for their intended purpose
4. measurement and sampling procedures.

4 § Producing the environment baseline study

SYT-5067 - The baseline of the environment surrounding a nuclear facility shall be determined before operation impacts the concentrations of radioactive substances or levels of natural background radiation. The environmental baseline study shall take into account the site environment, plant type and the anticipated operational impacts. The study shall be carried out in such a way that it represents the prevailing levels of radioactivity in the environment when the nuclear facility is put into operation.

SYT-5065 - The environmental baseline study shall include soil and water samples from various stages of the food chain that lead to humans, as well as air and deposition samples and indicator organisms.

SYT-5066 - The baseline environmental study shall be conducted for the monitoring items specified in Appendix 1, considering the emission potential of release routes and location of the nuclear facility, as well as the impact of seasonal variation on the data to be collected. The study shall include a sufficiently wide range of organisms to allow for comparisons based on the results. Seasonal and annual variations shall be adequately assessed.

5 § Content of the environment baseline study

SYT-5071 - The environment baseline study referenced in Section 54 of the Nuclear Energy Act shall include the following information:

1. the sampling and measurement locations and the criteria for their selection
2. the monitoring items listed in Appendix 1, their sampling frequencies as well as the justifications for the selection of scope
3. the sampling and measurement activities carried out in accordance with Appendix 1 including their timing and frequency
4. the measurement and sampling methods and their suitability for their intended purpose
5. the results obtained during the baseline assessment and evaluation of the results.

6 § Plan for organising environmental radiological monitoring

SYT-5072 - The environmental radiological monitoring referred to in Section 56 of the Nuclear Energy Act shall form an appropriate whole at each stage of the facility's lifecycle.

SYT-5069 - When drawing up a plan for the organisation of environmental radiological monitoring, the results of the baseline environmental study, the environment of the facility site, the type of facility and the anticipated effects of the activities shall be taken into account.

SYT-5070 - Environmental radiological monitoring shall be carried out for monitoring items specified in Appendix 2 at the required frequency and extent and taking into account the emission potential of release routes and the location of the nuclear facility. On the basis of environmental radiological monitoring, the licensee shall identify any addition to the concentrations radioactive substances caused by the nuclear facility and detect long-term changes in the dose rates of the plant environment.

SYT-5068 - Measurements shall be taken from the air, soil, and water environments. These measurements shall take into account the identified release routes and radionuclides present in the facility's releases. The dose rate in the environment of the facility shall be monitored.

7 § Information to be included in the environmental radiological monitoring plan

SYT-5077 - The environmental radiological monitoring plan shall include the following:

1. the planned sampling and measurement locations and the grounds for selecting them;
2. the grounds for the selection of the monitoring items listed in Appendix 2 and the frequency and the scope of their monitoring
3. the samples and the measurements included in the environmental radiation monitoring as well as their timing and frequency
4. descriptions of the measurement methods used and information on their suitability for their intended purpose
5. information on the procedures used to carry out the measurements and sampling
6. procedures used for evaluating the results of environmental radiation monitoring.

8 § Implementation of environmental radiation monitoring

SYT-5079 - The levels of radiation in the environment, as well as the concentrations of radioactive substances and any changes therein, shall be monitored and assessed as a whole.

SYT-5075 - The measurements shall be such that any increase in radionuclide concentrations originating from the nuclear facility can be detected in relation to the local background concentration of the radionuclide in question.

9 § Changes to the environmental radiation monitoring plan

SYT-5076 - The content and implementation of environmental radiation monitoring shall be reviewed at least every three years and whenever necessary. Any changes to the organisation of environmental radiation monitoring shall be justified.

SYT-5074 - According to Section 416 (426) Subsection 1, Paragraph 3 of the Nuclear Energy Act, significant changes are those that substantially alter the previously approved environmental radiation monitoring whole. Such changes include but are not limited to the following:

1. permanent changes to sampling frequency or scope
2. permanent reduction or increase of the number of monitoring points
3. changes to the environmental radiation monitoring equipment or measurement procedures that result in a significant change to the approved measurement arrangement.

SYT-5073 - Any changes other than those referred to in Subsection 2 shall be reported to the Radiation and Nuclear Safety Authority in accordance with Section 416 (426) Subsection 2 of the Nuclear Energy Act.

10 § Abnormal situations

SYT-5090 - Environmental radiation monitoring shall be increased as necessary if there are exceptional observations in the release measurements of a nuclear facility, or if there is a justified reason to suspect abnormal releases or an unusual radiation situation at or near a nuclear facility. This shall be implemented by increasing the sampling frequency or the

number of monitoring points, or by other appropriate means.

11 § Measuring equipment

SYT-5082 - Equipment for measuring continuous dose rates shall be installed in the environment of the nuclear facility. Continuous external radiation monitoring stations shall be positioned so that the monitoring system can detect any potential release of radioactive substances in real time and determine the direction of the release in the event of an accident. Continuous dose rate measurements shall be accompanied by passive backup dose monitoring.

SYT-5089 - Radiation levels in the environment around the nuclear facility shall be continuously monitored. The obtained measurement data shall be used for real-time monitoring of radiation levels in the environment.

SYT-5083 - The measuring equipment shall be calibrated and undergo regular maintenance.

SYT-5085 - The continuous external radiation dose rate measurement system and its associated data transmission system shall function reliably also under exceptional environmental conditions. A backup procedure is required for the measurement system in case of failure or malfunction of the plant or equipment. The system shall be able to operate without an external power supply for a minimum of seven days.

12 § Collection equipment

SYT-5078 - The collection of air and deposition samples shall be continuous, representative and appropriate to the prevailing weather conditions.

SYT-5478 - Continuous sampling devices shall have alarm functions that enable the rapid detection of malfunctions.

SYT-5095 - The air sampling methods shall be suitable for collecting of particulate matter. Additionally, nuclear facilities whose releases may contain gaseous substances that are significant in terms of the dose received by a representative person in the vicinity of the facility shall use air sampling devices that can separate gaseous substances (excluding inert gases).

SYT-5091 - The samples shall be analysed frequently enough to reliably determine the significant radionuclides in the releases of radioactive substances from the nuclear facility.

13 § Entry into force and transitional provisions

SYT-5881 – This regulation shall enter into force on X X 202X and shall remain valid until further notice.

Appendices

SYT-5086 - APPENDIX 1: Monitoring items in the environment baseline study

Monitoring item	Description	Frequency	Scope
Dose rate (gamma and neutron)	Detection of the prevalent dose rate around the facility	Continuous and passive (backup) monitoring	Evenly distributed in the most important directions in the vicinity of the plant site
Air samples	Monitoring of airborne particulate matter and iodine activity	Continuous collection	Comprehensive coverage of the main dispersion directions in the vicinity of the plant site (at minimum)
Deposition	Wet and dry deposition activity monitoring	Continuous collection	Comprehensive coverage of main dispersion directions in the vicinity of the facility
Soil	Determination of background levels of radioactive substances	One-time	Comprehensively along the main dispersion direction
Food chain products	Determination of background levels of radioactive substances that may be transferred to humans	Annually (minimum)	Comprehensively in accordance with the prevailing environment and known food chains
Domestic and ground water	Determination of background levels of radioactive substances that may be transferred to humans from domestic	Regularly	Comprehensively in accordance with prevailing water resources and water use

	and ground water		
Terrestrial environment indicator species	Determination of background levels of radioactive substances in the terrestrial environment	Annually (minimum)	Comprehensively in accordance with the prevailing environment, along the main dispersion direction
Water environment indicator species	Determination of background levels of radioactive substances from the water environment	Annually (minimum)	Comprehensively in accordance with the prevailing environment, along the main dispersion direction
Water bodies depending on the release route (river/lake/sea)	Monitoring of the main release route from the plant into water bodies	Regularly	Comprehensively in accordance with the prevailing environment, along the main dispersion direction
Sinking matter	Determination of background levels of radioactive substances	Continuous collection	Comprehensively in accordance with the prevailing environment, along the main dispersion direction
Bottom sediment	Determination of background levels of radioactive substances	One-time	Comprehensively in accordance with the prevailing environment, along the main dispersion direction

Humans	Determination of background levels of radioactive substances in residents living in the vicinity of the facility	One-time	Comprehensive survey of residents living in the vicinity of the facility
Special areas	Determining the background level for items that may be significant in terms of environmental, biological or human exposure to radiation	Regularly/ one-time depending on the characteristics of the item.	In accordance with the intended use of the items

SYT-5081 - APPENDIX 2: Monitoring items in environmental radiation monitoring.

Monitoring item	Description	Frequency	Scope
Dose rate (gamma and neutron)	Detection of dose rate from the facility	Continuous and passive (backup) monitoring	Evenly distributed in the most important directions in the plant environment
Air samples	Monitoring of airborne particulate matter and iodine activity monitoring	Continuous collection	Comprehensive coverage of main dispersion directions in the vicinity of the facility
Deposition	Wet and dry deposition activity monitoring	Continuous collection	Comprehensive coverage of main dispersion directions in the vicinity of the facility
Soil	Monitoring of changes in local deposition	Periodically	Comprehensively along the main dispersion direction
Food chain products	Monitoring of radioactive substances that may be transferred to humans from the soil and the water environment	Annually (minimum)	Comprehensively in accordance with the prevailing environment and identified food chains
Domestic and ground water	Monitoring of radioactive substances may be transferred to humans from domestic and ground water sources; leak monitoring of plant systems	Regularly	Comprehensively in accordance with prevailing water resources
Soil environment indicator species	Indication of the environmental impact of possible radioactive releases	Annually (minimum)	Comprehensively in accordance with the prevailing environment, along the main dispersion direction
Water environment	Indication	Annually (minimum)	Comprehensively in

indicator species	of the environmental impact of radioactive releases		accordance with the prevailing environment along the main dispersion directions
Water bodies depending on the release route (river/lake/sea)	Monitoring of the main release routes from the plant into water bodies	Regularly	Comprehensively in accordance with the prevailing environment, along the main dispersion directions
Sinking matter	Monitoring of potentially radioactive substances	Continuous collection	Comprehensively in accordance with the prevailing environment, along the main dispersion directions
Bottom sediment	Monitoring of potentially radioactive substances	Regularly	Comprehensively in accordance with the prevailing environment, along the main dispersion directions
Humans	Determination of background levels of radioactive substances in residents living in the vicinity of the facility	Regularly	Comprehensive survey of residents living in the vicinity of the facility
Special areas	Monitoring of targets identified in accordance with the use of the facility that may be relevant to the radiation exposure of the environment, living organisms or humans	Regularly	In accordance with the intended use of the identified items.