

DECREE

No. 360/2016 Coll.

of 17th October 2016

on radiation situation monitoring

The State Office for Nuclear Safety sets, pursuant to § 236 of Act No. 263/2016 Coll., the Atomic Act, to implement § 9(2) c), § 24(7), § 25(2) a) to c) and e), § 69(2) d) and e), § 111(3) d), § 149(6) a) to c) and § 150(4) a) to c):

§ 1

Scope

This Decree incorporates the relevant Euratom legislation¹⁾ and simultaneously follows on the directly applicable regulation of Euratom²⁾ and regulates

- a) list of changes affecting the monitoring of radiation situation of category III workplace and category IV workplace;
- b) requirements for the content of the documentation for licensed practices in the field of radiation situation monitoring;
- c) list of the quantities and facts relevant to the monitoring of radiation situation;
- d) the scope and method of monitoring, measuring, evaluation, verification and recording of the quantities and facts relevant to the monitoring of radiation situation and the storage of information thereon;
- e) the scope and method of transmitting information to the Office in relation to the quantities and facts relevant to the monitoring of radiation situation;
- f) the range of data transmitted to the European Commission and the Office, and the way it is to be transmitted;
- g) list of changes relating to the monitoring of radiation situation in the workplace with ionising radiation source;
- h) the scope and method of documenting the change relating to the monitoring of radiation situation in the workplace with ionising radiation source and notification of such change to the Office;
- i) the scope and method of monitoring of radioactive waste repositories;
- j) detailed requirements for the form and method of radiation situation monitoring;
- k) criteria for selecting other individuals to carry out the monitoring of radiation situation;
- l) the content of the National Monitoring Programme;
- m) requirements for the activities carried out by measurement laboratory and its equipment;
- n) the scope and method of carrying out comparative measurements; and
- o) the content of the annual monitoring report of discharges and the surrounding areas.

¹⁾ Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom.

²⁾ Treaty establishing the European Atomic Energy Community.

§ 2

Definitions

For the purposes of this Decree, the following definitions apply:

- a) diversified diet means a mixture of selected basic foodstuffs, the composition and quantity in the mixture of which correspond to the average daily consumption of a member of the public of the Czech Republic; and
- b) diversified diet items means different basic types of food.

§ 3

Radiation situation monitoring

[To § 149(6) a) of the Atomic Act]

The monitoring of radiation situation on the territory of the Czech Republic to determine the magnitude of external and internal exposure of the public shall be carried out in such a way

- a) during normal monitoring
 1. to ensure the systematic and continuous measurement of exposure level;
 2. to set the usual exposure levels;
 3. to allow the early detection of any increased level of external exposure above usual values; and
 4. to confirm the occurrence of emergency exposure situation;
- b) during accidental monitoring
 1. to identify and characterise the release of radioactive material occurred and the spread of ionising radiation; in the case of emergency exposure situation, which has occurred on the territory of the Czech Republic, the monitoring of radiation situation includes the estimation of the distribution of the release of radioactive material and ionising radiation occurred in the vicinity of the nuclear installation or workplace, where the radiation extraordinary event occurred, or in the vicinity of the site where the emergency exposure situation was caused by a malicious act;
 2. to identify the contaminated area; and
 3. to allow the prediction of the development of emergency exposure situation.

§ 4

Monitoring networks

[To § 149(6) a) of the Atomic Act]

- (1) The monitoring shall be carried out through monitoring networks.
- (2) The monitoring networks are divided
 - a) by area, into sparse network³⁾ and dense network⁴⁾, which is subdivided into territorial network, which covers the entire territory of the Czech Republic, local network, which covers the selected area and is intentionally concentrated thereon,

³⁾ Art. 2 point e) of Recommendation 2000/473/Euratom on the application of Article 36 of the Euratom Treaty concerning the monitoring of the levels of radioactivity in the environment for the purpose of assessing the exposure of the population as a whole.

⁴⁾ Art. 2 point d) of Recommendation 2000/473/Euratom.

- and border network, which covers the border of demarcated or enclosed area, as appropriate; and
- b) by purpose and the method of measurement or sampling used, into network for external and internal exposure.
- (3) For details on dividing the monitoring networks see Annex 1 hereto.

§ 5

Monitoring sites

[To § 149(6) a) of the Atomic Act]

(1) The monitoring sites are divided into measuring, sampling and collection sites.

(2) The monitoring sites are subdivided into permanent and non-permanent sites. For non-permanent monitoring sites, where one measurement, one sampling or one collection shall be only undertaken, the latitude and the longitude shall be at least determined, and for permanent monitoring sites, the name and the altitude shall be also determined. An identifier shall be assigned by the Data Centre of the Office to all monitoring sites.

(3) The monitoring and sampling sites, except measuring sites on monitoring routes and in border networks, shall be determined before the start of the relevant measurement or sampling so as to minimise the possible influence of surrounding buildings, ground cover and any other objects on the result of the measurement. The measuring and sampling sites in local networks, the measuring sites on monitoring routes and the collection sites shall be determined in order to enable the results of the monitoring to be used in accidental monitoring to develop the proposal for introduction, specification or withdrawal of protective measures.

- (4) The measuring sites for carrying out measurements in monitoring networks
- a) for external exposure, except monitoring routes, must allow for the installation of the measuring devices to a height of at least 1 m above the ground;
- b) of Early Warning Network shall be determined so densely to allow the early detection of any increased level of external exposure above usual values on the territory of the Czech Republic, while the usual values are regarded as the upper limits of commonly occurring values of all the previous measurements carried out in the measuring site in question; and
- c) of Teledosimetry System must allow for, in emergency exposure situation occurred in a nuclear power installation or following suspicion thereof, the early detection of any release of radioactive substances or the distribution of ionising radiation into the air, and the estimation of its magnitude.

- (5) The sampling sites shall be determined in order to take samples of
- a) the environment in the atmosphere, hydrosphere, pedosphere and on the earth's or another surface; the permanent sampling sites for taking samples in the hydrosphere must make it possible for surface water, except river water, to take samples of the large bodies of water; for river water in locations where flow detection is possible; for drinking water in locations where it is possible to report appropriate volumes of the water produced or supplied to the supply network per year; and for waste water in locations where it is possible to determine the volume of discharge; and

b) the food chain in commercial network or for the producer of milk, milk products, items of diversified diet or feed; the sampling sites for taking samples by self-picking of berries and mushrooms shall be selected with a view to characterising the area of their occurrence.

(6) The collection sites are sites of collection and taking of samples of excreta; in accidental monitoring, moreover samples of the food chain; and the sites of concentration of persons for measuring the content of radionuclides in the selected organs of the human body or in the whole human body.

§ 6

Monitored items

[To § 149(6) a) of the Atomic Act]

(1) The monitored items characterising the external field of ionising radiation sources that can cause external exposure and which are located in the atmosphere, hydrosphere, pedosphere and on the earth's or another surface, are air, water, soil, and surface of the human body, the body of an animal and an object.

(2) The monitored items, for which the content of radionuclides is monitored and which, if they are ingested or inhaled, can cause internal exposure, are air and water, which represent the environment, as well as milk, milk products, diversified diet, items of diversified diet and feed, which represent the food chain.

(3) The monitored items, for which the internal exposure is monitored, are excreta, selected organs of the human body or the whole human body.

(4) For details on the monitored items division pursuant to paragraphs 1 to 3 see Annex 2 hereto.

§ 7

Measurement and evaluation of physical quantities

[To § 149(6) a) of the Atomic Act]

(1) Direct measurement shall be carried out as instantaneous at a specific point of time or integral over a specific period of time, continuous for a specific period of time, single or repeated. Indirect measurement shall be carried out in the measurement laboratory after taking and possibly processing the sample; for assignment of the type of measurement to each network see Annex 1 hereto.

(2) New measurement procedures or revisions thereof shall be put into practice after their successful verification, in particular within the scope of drill or comparative measurement. Comparability of the values obtained by different processes, compliance of the requirements for the lowest detectable values of the physical quantities to be measured and, where appropriate, for the range of measurements, referred to in Annex 3 hereto, shall be verified.

(3) For details on measuring and evaluating the physical quantities in monitored items see Annex 3 hereto.

§ 8

Measuring and sampling devices

[To § 149(6) a) of the Atomic Act]

(1) The measuring device used to measure the relevant physical quantities in the measuring sites shall

- a) meet the requirements for the lowest detectable value of the physical quantity to be measured or for the range of measurements as referred to in Annex 3 hereto;
- b) be capable of measuring even under difficult meteorological conditions;
- c) provide date and time data of measurement in addition to the result of the measurement in the Early Warning Network;
- d) provide date and time data of measurement and geographical coordinates for the measuring site in addition to the result of the measurement on monitoring routes; and
- e) provide time data of measurement in addition to the result in the network of spectrometry measurement.

(2) The measuring device used to measure the relevant physical quantities characterising the content of radionuclides in the monitored items shall make it possible to determine the content of radionuclide in the sample taken in the sampling site or in the sample representing the human body or in the whole body and shall meet the requirements for the lowest detectable value of the physical quantity to be measured, referred to in Annex 3 hereto.

(3) The sampling device

- a) used in the sampling site shall make it possible to take samples in such a way that the subsequent measurement of samples meets the requirements for the lowest detectable value of the physical quantity to be measured, referred to in Annex 3 hereto;
- b) designed to take samples of air and aerosols shall make it possible to continuously take samples and determine the flow or volume of the air taken;
- c) arranged in a set of devices designed to take samples of discharges to the air and liquid discharges shall make it possible to determine the volume of discharge; and
- d) located stably in the sampling site shall be capable of taking samples even under difficult meteorological conditions.

(4) For devices pursuant to paragraphs 1 to 3 listed in the Monitoring Programme or in the National Monitoring Programme, the stability of parameters shall be checked and the calibration shall be carried out.

§ 9

Samples

[To § 149(6) a) of the Atomic Act]

(1) The sample shall be taken as

- a) point or continuous sample;
- b) mixed or representative.

(2) The sample shall be taken in the quantity allowing for its measurement, which shall meet the requirement for the lowest detectable value of the physical quantity to

be measured pursuant to Annex 3 hereto or, where appropriate, its repeated measurement, if it is specified for the monitored item in question in the relevant Monitoring Programme. The sample for repeated measurement shall be kept at least until the instruction for its destruction has been issued by the Data Centre of the Office.

(3) A record of sampling shall be made for each of the samples taken, which shall contain data, an overview and a form of which are provided in Annex 4 hereto and which, together with the sample taken, shall be submitted, directly or through collection sites, to the measurement laboratory.

§ 10

Measurement laboratory

[To § 149(6) a) and § 150(4) a) of the Atomic Act]

(1) The measurement laboratory shall carry out the receipt of the sample taken in accordance with § 9, preparation for measurement or, where appropriate, processing, measurement and evaluation of measurement of the sample taken.

(2) The measurement laboratory shall

- a) take over the sample and confirm its takeover;
- b) take over the completed record of sampling;
- c) check the data in the record for completeness;
- d) check the identification of the sample for compliance with the relevant data in the record of sampling;
- e) register the sample and assign a unique identification to the sample; and
- f) sort the samples by contamination in emergency exposure situation.

(3) Furthermore, the measurement laboratory shall

- a) perform measurement the content of individual radionuclides in samples in accordance with the requirements for the lowest detectable value of the physical quantity to be measured, referred to in Annex 3 hereto;
- b) check, systematically during measurement, the proper performance of measurement in order to ensure its repeatability, accuracy and sensitivity;
- c) transmit the data concerning the sample, obtained from the record of sampling, and the measurement, obtained from the record of measurement, referred to in Annex 4 hereto, to the Data Centre of the Office;
- d) take part in the comparative measurement; and
- e) keep records of the activities to be carried out and store them for a period of 10 years; for the activities carried out in connection with accidental monitoring in case of radiation accident, the records shall be stored for a period of 30 years. Where the measurement laboratory is unable to meet the period for storing the records, it shall transmit the records to the Data Centre of the Office.

§ 11

Transmission of monitoring data

[To § 149(6) a) and § 150(4) c) of the Atomic Act]

(1) Persons pursuant to § 149(2) of the Atomic Act shall transmit the monitoring data, which contain, in addition to the results of the measurement, the date, and time

and geographical data, to the Data Centre of the Office, without delay after such data have been obtained, remotely⁵⁾ in a data format, which shall meet the requirements of the set of technical measures (hereinafter referred to as the “data interface”), referred to in the National Monitoring Programme.

(2) The data interface for data from the early warning network, network of integral measurement, network of instantaneous measurement, border network and the network of internal exposure monitoring shall be uniform for the network in question.

(3) When remote access pursuant to paragraph 1 is non-functional or remote data transmission is impossible in emergency exposure situation, data transmission in an analog form or on other digital data carriers approved by the Data Centre of the Office is permitted.

(4) For content of the annual monitoring report of discharges and the surrounding areas see Annex 5 hereto.

§ 12

Data Centre of the Office

[To § 149(6) a) of the Atomic Act]

(1) The Data Centre of the Office shall

- a) continuously receive the monitoring data through the data interface defined in the National Monitoring Programme;
- b) assess the monitoring data in terms of its usability pursuant to Annex 3 hereto;
- c) compare the monitoring data with the monitoring levels referred to in the National Monitoring Programme; in case of exceeding the relevant monitoring level, the Data Centre of the Office shall verify that such exceeding is not a consequence of emergency exposure situation; if this is an error, the Data Centre of the Office shall investigate the cause thereof and require data supplier to rectify the situation;
- d) collect, store and retain the monitoring data; for data obtained from the normal monitoring carried out during emergency exercise, drill or comparative measurement or for data obtained from the accidental monitoring, the Data Centre of the Office shall store and retain data separately from other data transmitted;
- e) publish⁶⁾ the monitoring data preferably as spatial data⁷⁾, in a way, which allows for remote access and display of data for the needs of crisis management involving the use of uniform geographical information in accordance with other legislation⁸⁾;
- f) process the monitoring data in the form of documents required to prepare the proposal to the Office pursuant to § 208 f) of the Atomic Act and to introduce, confirm, specify or repeal the protective measures for data obtained from the accidental monitoring;
- g) incorporate the monitoring data in the annual monitoring report of radiation situation on the territory of the Czech Republic; and

⁵⁾ Section 2 n) of Act No. 365/2000 Coll., on the Information Systems of the Public Government and on Amendment to Certain Acts, as amended.

⁷⁾ Section 2 e) of Act No. 123/1998 Coll., as amended.

Decree No. 103/2010 Coll., implementing certain provisions of the Act to provide environmental information, as amended by Decree No. 257/2015 Coll.

⁸⁾ Section 26a of Act No. 240/2000 Coll., on Crisis Management and on Amendment to Certain Related Acts (the Crisis Act), as amended.

h) store the monitoring data older than 10 years on data carriers, which allow for possible future processing in historical series.

(2) Pursuant to the Treaty establishing the European Atomic Energy Community⁹⁾, the Data Centre of the Office shall remotely transmit to the European Commission the usable data

- a) from the monitoring of radiation situation on the territory of the Czech Republic continuously carried out by monitoring networks of external and internal exposure from radionuclides contained in the air;
- b) from the normal monitoring carried out within the sparse network for the calendar year by 30 June of the following year¹⁰⁾; and
- c) from the monitoring of discharges from nuclear power plants for the calendar year in the form of standardised information pursuant to Annex 6 hereto by 30 September of the following year¹¹⁾.

(3) Furthermore, the Data Centre of the Office shall

- a) provide the measurement laboratory with identifiers of permanent monitoring sites and the supplier of data from direct measurement with identifiers of permanent measuring sites;
- b) provide the licensee with data formats for data transmission;
- c) instruct the measurement laboratory to destroy the sample for repeated measurement; and
- d) ensure compatibility with the formats of spatial data defined by other legislation¹²⁾.

§ 13

Scope and method of carrying out comparative measurement

[To § 150(4) b) of the Atomic Act]

(1) The comparative measurement shall verify compliance with the requirements of measurement and evaluation of physical quantities for the lowest detectable value of the physical quantity to be measured or the range of measurement pursuant to Annex 3 hereto and for the uncertainty of measurement results.

(2) The comparative measurement is divided into preliminary, implementation and evaluation parts. The preliminary part includes the preparation of a reference sample, preparation of instructions or, where appropriate, a questionnaire for the participants in the comparative measurement, setting of the date and conditions of measurement, including the desired data format. The implementation part includes the preparation for measurement, possible processing of the sample in question,

⁹⁾ Art. 35 and 36 of the Treaty establishing the European Atomic Energy Community. Commission Recommendation 2004/2/Euratom of 18 December 2003 on standardised information on radioactive airborne and liquid discharges into the environment from nuclear power reactors and reprocessing plants in normal operation.

¹⁰⁾ Commission Recommendation 2000/473/Euratom.

¹¹⁾ Commission Recommendation 2004/2/Euratom.

¹²⁾ Section 2 and Section 3 of Government Regulation No. 430/2006 Coll., establishing geodetic reference systems and national map series mandatory on the territory of the state and principles of their use, as amended by Government Regulation No. 81/2011 Coll., amending Government Regulation No. 430/2006 Coll., establishing geodetic reference systems and national map series mandatory on the territory of the state and principles of their use.

measurement, evaluation of the results and data transmission in the desired data format and specified data interface.

(3) For range of comparative measurements organised by the Office see Annex 7 hereto. The Office shall set out the evaluation criteria for the results of the comparative measurement and shall subsequently use such criteria to evaluate the relevant measurement. Following the evaluation of the results of comparative measurement, the Office shall determine which results failed to meet the defined criteria for such measurement, and evaluate whether or not the participant was successful in the comparative measurement.

§ 14

Quantities and facts relevant to the monitoring of radiation situation

[To § 25(2) a) to c) and e) of the Atomic Act]

(1) The quantities relevant to the monitoring of radiation situation are physical quantities characterising the radiation field and the content of radionuclides in the monitored items, referred to in Annex 3 hereto.

(2) The facts relevant to the monitoring of radiation situation are as follows

- a) results of the check that the measurement is carried out correctly pursuant to § 10(3) and the check of the stability of the parameters of measuring and sampling devices pursuant to § 8(4);
- b) activities carried out by the measurement laboratory pursuant to § 10;
- c) records of sampling pursuant to § 9(3) and records of measurement pursuant to § 10(3);
- d) monitoring data, data formats, data interfaces pursuant to § 11(1);
- e) facts characterising liquid and gaseous discharges from workplaces;
- f) facts characterising ionising radiation field and the occurrence of radionuclides in the workplace surrounding area;
- g) values of monitoring levels and activities in exceeding them;
- h) evaluation of the success carried out by the organiser of comparative measurement pursuant to § 13(3) and documents of the elimination of deficiencies, if any identified by the organiser; and
- i) samples for the needs to start the institutional control.

(3) The quantities pursuant to paragraph 1 shall be monitored, measured, evaluated, verified and recorded and the facts pursuant to paragraph 2 points a) to h) shall be evaluated, verified and recorded to the extent and in the manner defined in the Monitoring Programme.

(4) For the quantities and facts relating to the monitoring of

- a) category IV workplace, which is any nuclear installation, records shall be kept throughout the operation of workplace and over the period of the decommissioning of workplace and then for a period of 10 years after decommissioning; and
- b) radioactive waste repository, all the facts pursuant to paragraph 2 point i) and the records thereof shall be kept for at least 50 years or until the institutional control has started.

(5) Where the licensee is unable to meet the period for keeping the record pursuant to paragraph 3 or 4 or storing the samples, it shall transmit the records or samples to the Data Centre of the Office.

(6) When the licensee or the measurement laboratory transmits the data obtained from the monitoring of radiation situation, it shall also forward the information to the Data Centre of the Office concerning the exceeding of the monitoring levels defined in the Monitoring Programme. For transmission of the data obtained from the monitoring of discharges from nuclear power plants and reprocessing plant, such data shall be also transmitted in the form of standardised information pursuant to Annex 6 hereto.

§ 15

Criteria for selecting other persons to carry out the monitoring of radiation situation

[To § 149(6) b) of the Atomic Act]

(1) The criteria for selecting other individuals to carry out the monitoring of radiation situation are as follows

- a) evaluation of participation in the comparative measurement pursuant to § 13(3) as successful; or
- b) finding of no deficiency in monitoring drill for monitoring network, physical quantity and monitored item, if it is a monitoring network, physical quantity or monitored item, for which no comparative measurements are organised.

(2) The Office shall carry out inclusion in participation in the comparative measurement or monitoring drill on the basis of the documents submitted by any other person such as

- a) an overview of physical quantities and monitored items, which the other person intends to monitor, and monitoring networks, in which the other person intends to monitor;
- b) information concerning the staffing of monitoring pursuant to paragraph 2 a), which the other person intends to monitor;
- c) an overview of the measuring devices considered to ensure monitoring pursuant to paragraph 2 a), which the other person intends to monitor including information concerning the range of measurement of the measuring devices and the document for the last stability check of parameters and calibration performed; and
- d) proposal for the procedure to be followed in monitoring by the other person.

§ 16

The content of the National Monitoring Programme

[To § 149(6) c) of the Atomic Act]

The National Monitoring Programme shall contain

- a) a list of persons, who, under this Programme, ensure the monitoring, including contact details of representatives responsible for monitoring;
- b) an overview of monitoring networks, including a list of monitoring sites, with details pursuant to § 5(2) and their indication in a digitalised map document;
- c) a list of monitored items, including their division into all levels and a list of the physical quantities to be measured therein;

- d) a list of all the procedures taken into account for activities in monitoring, including the range and frequency of each activity;
- e) a list of measuring and sampling devices, description of their parameters, determination of the frequency of stability check of their parameters and calibration;
- f) a list of measurement laboratories;
- g) description of the data formats and the form of data transmission pursuant to § 11, including requirements for the relevant data interfaces;
- h) a list of samples, for which repeated measurement may be required;
- i) definition of particular activities and equipment used pursuant to points b) to h) in monitoring for specified persons pursuant to point a); and
- j) monitoring levels and an overview of appropriate countermeasures if the reference levels are exceeded.

§ 17

Changes affecting the monitoring of radiation situation

[To § 9(2) c) of the Atomic Act]

Changes affecting the monitoring of radiation situation are changes in the vicinity of category III workplace and category IV workplace, which

- a) have an immediate impact on the monitoring of radiation situation; and
- b) are a consequence of the start of
 1. the construction of nuclear installation or any other category IV workplace, except workplace with a nuclear facility; or
 2. the operation of any other category III workplace or category IV workplace.

§ 18

Changes relating to the monitoring of radiation situation in the workplace with ionising radiation source

[To § 69(2) d) and § 69(2) e) of the Atomic Act]

(1) Changes relating to the monitoring of discharges and the surrounding areas are changes made

- a) in procedures for taking and processing a sample; or
- b) in procedures for measuring and evaluating physical quantities made by their updates or revisions or, where appropriate, by adopting a new procedure.

(2) The licensee shall record the changes and notify the Office thereof 30 days before making such changes.

§ 19

Requirements for the content of the documentation for licensed practices in the field of radiation situation monitoring

[To § 24(7) of the Atomic Act]

(1) The intention to monitor discharges from a nuclear installation or from category IV workplace, except workplace with a nuclear facility shall include

- a) description of the projected amount, type and composition of discharges;

- b) the scheduled starting date of release and monitoring of discharges considered under point a);
- c) an overview of envisaged monitoring networks including a list of the monitoring sites considered and data pursuant to § 5(2);
- d) a list of expected measured physical quantities and monitored items including division of the items into all levels;
- e) a list of envisaged measuring and sampling devices, and proposal for the frequency of stability check of their parameters;
- f) description of the envisaged method of handling of samples, including the method of destruction of the samples taken in accidental monitoring;
- g) a list of envisaged measurement laboratories;
- h) a list of the envisaged procedures for all monitoring activities including balancing;
- i) proposal for the range and frequency of monitoring; and
- j) proposal for the envisaged method of data transmission pursuant to § 11 and record retention.

(2) The Monitoring Programme for discharges and the surrounding areas shall include

- a) an overview of monitoring networks;
- b) a list of measured physical quantities and monitored items including division of the items into all levels;
- c) an overview of monitoring sites including data pursuant to § 5 for normal and accidental monitoring including their drawing on a digitalised map;
- d) description of the method of handling of samples, including the method of destruction of the samples taken in accidental monitoring;
- e) a list of measurement laboratories;
- f) the range and frequency of measurement and balancing;
- g) description of the method of data transmission pursuant to § 11 and record retention;
- h) a list of used measuring and sampling devices and their parameters;
- i) the range and frequency of taking samples for normal and accidental monitoring;
- j) monitoring levels values and an overview of appropriate countermeasures if the values are exceeded;
- k) the frequency of data transmission from each of monitoring networks;
- l) description of the data interface for data transmission; and
- m) a list of procedures for all monitoring activities.

(3) The Monitoring Programme pursuant to Annex 1 of Part 1 letter a) point 5 and Part 2 letter a) point 8 of the Atomic Act only applies to the surrounding areas monitoring.

(4) The description of the method of surrounding areas monitoring after the closure of a radioactive waste repository shall include

- a) definition of the surrounding areas , in which the monitoring will take place;
- b) an overview of monitoring networks;
- c) a list of measured physical quantities and monitored items including division of the items into all levels;
- d) a list of the monitoring sites considered including data pursuant to § 5;
- e) a list of measuring and sampling devices, and proposal for the frequency of stability check of their parameters;
- f) Description of the envisaged method of handling of samples;

- g) a list of measurement laboratories;
- h) a list of procedures, range and frequency of measurement; and
- i) description of the envisaged method of data transmission pursuant to § 11.

§ 20

Entry into force

This Decree shall enter into force on 1 January 2017.

Chairperson:

Ing. Drábová, Ph.D., m. p.

Details on the monitoring networks division

Table 1: Sparse and dense network

Network	Name of the network by territorial division	Territorial distribution	Name of the territory (area/surrounding areas /grounds)
Sparse , composed of the sampling sites (for details on the monitored items see Table 1 of Annex 3)	Territorial	Represents the entire territory of the Czech Republic	Czech Republic
	Dense , composed of the monitoring sites (for details on the monitored items see Tables 2 to 8 of Annex 3)	Territorial ^{a)}	Represents the areas listed ^{b)}
Prague and Central Bohemia			
South Bohemia			
West Bohemia			
East Bohemia			
North Bohemia			
South Moravia			
North Moravia			
Local ^{c)}		Represents the the relevant workplace surrounding areas	The nuclear installation (power) surrounding areas
			The nuclear installation (any other) surrounding areas
	The category III and IV workplace, which is not a nuclear installation, surrounding areas		
	Represents the grounds of the relevant workplace	Grounds of the nuclear installation (power)	
Grounds of the nuclear installation (other than power)			
Grounds of the category III and IV workplace, which is not a nuclear installation			
Represents the surrounding areas around the heap, sludge bed or any other residues from			

		the practices associated with the extraction of radioactive mineral or from any other mining practices associated with the occurrence of radioactive mineral pursuant to § 88(4) of the Atomic Act	
	Border	Closure	Closure near the municipality ^{d)}
		Selected border crossing	Border crossing ^{e)}

Explanatory notes:

a) The monitoring sites within the dense network shall be located so that in territorial networks

1. The monitoring sites are representative for the area in question;
2. The monitored items of the environment and the monitored items of the food chain are characteristic of the area in question; and
3. The selected sampling points represent the areas with greater population density.

b) The names of areas are provided for ease of reference only; they are not precisely defined geographical areas.

c) The monitoring sites within the dense network shall be located so that in local networks

1. The monitored items are represented, allowing to monitor the content of radionuclides in discharges and from any release of radionuclides from a nuclear installation or category IV workplace, which is not a nuclear installation or, where appropriate, category III workplace;
2. The selected sampling points allow to estimate the exposure of representative individual; and
3. They allow to verify the requirements of exposure limitation, to demonstrate that radiation protection is optimised, and to ensure the other requirements for safe implementation of licensed practices, in particular early detection of deviations from normal operation.

d) The specific geographical name of the nearest municipality shall be added to the name.

e) The specific name of the border crossing shall be added to the name.

Table 2: Network for external and internal exposure

Network	Monitoring network name	Measurements performed or samples taken by the network
For external exposure , composed of the monitoring sites, where the quantities are measured, characterising the external field of ionising radiation of sources, which are located in the atmosphere, hydrosphere, pedosphere or, where appropriate, on the earth's or another surface	Early Warning Network, including Teledosimetry System	Instantaneous and continuous measurements
	Network of integral measurement	Integral and continuous measurements
	Network of instantaneous measurement	Instantaneous and single or instantaneous and repeated measurements
	Network of spectrometry measurement	Integral and single or integral and repeated measurements
	Network of monitoring routes ^{a)}	Instantaneous and single measurements
	Network of closures ^{b)}	Instantaneous and single measurements
For external and internal exposure	Network of environmental sampling, including discharges	Continuous or point sampling
For internal exposure , composed of the monitoring sites, where the content of representative radionuclides in the environment, food chain or the human body is measured	Network of food chain sampling	Point, mixed or representative sampling
	Network of human body measurement	Integral and single measurements Continuous or point sampling

Explanatory notes:

^{a)} The measuring sites are evenly distributed along the route so that their density (measured each second) is approximately 1 measuring site per 10 m of the route for surface monitoring and 1 measuring site per 25 m of the route for aerial monitoring, unless otherwise specified by the Office.

^{b)} Only in emergency exposure situation.

Annex 2 to Decree No. 360/2016 Coll.

Details on monitored items division

The radionuclide contained in the monitored item can cause external or internal exposure (internal exposure pathways)	Monitored items division ^{a)}			
	Level 1	Level 2	Level 3	
External and internal (by inhalation)	Atmosphere	Air	Aerosols	
			Gaseous forms	
			Discharges to the air ^{b)}	
			Fallouts	
External and internal (if introduced to the food chain from the soil)	Pedosphere	Soil	Ground cover and snow	
			Soil and ground cover	
			Soils – in situ	
			Soils – aerial	
External and internal (by ingestion)	Hydrosphere	Water	Precipitation	
			Drinking water	
			Surface water	
			Ground supply water	
			Waste water	
			Discharges to the watercourses ^{c)}	
		External	Sludge	Water-supply sludge
				Sewage sludge
			Sediments	Sediments from tanks, ponds and lakes
				Sediments from sewage
				Sediments from watercourses
				Suspended sediments
External and internal (if introduced to the food chain)	Flora	Plant indicators	Needles	
			Leaves	
			Lichens	
			Mosses	
			Grass	
			Algae	
			Wood	
Internal (by ingestion)	Food chain	Milk	Goat milk	
			Cow milk	
			Sheep's milk	
		Milk products	Infant formulae	
			Yoghurt	

			Cream
			Whey
			Cheeses
			Curd
Internal (by ingestion)	Food chain	Diversified diet	Daily diet – proportion
			Daily diet – restaurants and canteens
			Daily diet – consumer basket
		Diversified diet items	Mushrooms
			Berries
			Slaughter meat
			Cereals
			Root crops
			Fruit
			Food products
			Fish
			Eggs
			Vegetable
			Crops ^{d)}
		Game meat	
		Medicines	Medicinal plants
			Products from medicinal plants
		Feedstuffs	Fodder plants
			Silage and haylage
			Other feedstuffs
Compound feeds			
Internal (the radionuclide is already in the human body and entered the body by ingestion, inhalation or through body surface)	Human body	Excreta	Urine
			Feces
			Others
	Selected organs	Thyroid gland	
		Others	
	Whole body	Inside the body	
		Body surface ^{e)}	
External and internal (if introduced to the human body or food chain)	Animals, objects ^{f)}		Surface

Explanatory notes:

^{a)} The selected monitored items are generally only evaluated in the annual report.

^{b)} Discharges to the air in gaseous and aerosol forms.

^{c)} Discharges to the watercourses in liquid form from control tanks and waste channel.

^{d)} With the processed or fed aerial part of the crop in emergency exposure situation.

^{e)} The surface contamination of the body shall be measured at closures in emergency exposure situation.

^{f)} Only at closures and border crossing in emergency exposure situation.

Details on the measurement and evaluation of physical quantities in monitored items¹

¹ The evaluation of physical quantities in monitored items involves the determination of the measurement result, which is the value of the physical quantity to be measured, uncertainty of its determination and the relevant unit of physical quantity, and the assessment of compliance with the requirements for the lowest detectable value or the range of measurement referred to in this Annex. The measured value is compared with the normal value, while the normal values are regarded as the upper limits of common values of all the previous measurements carried out in the monitoring point in question. For deviation of the measured quantity from the normal values, the causes of this deviation shall be identified or, where appropriate, the situation shall be rectified.

The monitoring data shall constitute the result of the measurement, date and time data of measurement and the geographical coordinates of the monitoring site for non-permanent monitoring point, or the identifier for permanent monitoring site.

The monitoring data are applicable to the assessment of external and internal public exposure if they contain all the necessary information listed above, if the requirements for the lowest detectable value or the range of measurement set out in this Annex were met, and if the measurement uncertainty meets the requirements set out in the relevant procedure. The monitoring data obtained during calibration of measuring devices, or during emergency exercise, drill or comparative measurement or influenced by extreme meteorological phenomena or any other activity shall not be used for to assess external and internal public exposure.

TABLE 1: Details on the monitored items measured and evaluated in the sparse network

Sampling site	Monitored item	Measured physical quantity	Frequency of sampling and measurements	Radionuclide	Lowest detectable value of the physical quantity to be measured	Unit
Praha – Bartoškova	Aerosol	Activity concentration ^{a)}	Week	¹³⁷ Cs	1x10 ⁻⁶	Bq/m ³
				⁷ Be	1x10 ⁻⁴	Bq/m ³
Moravský Svätý Ján	Surface water	Activity concentration	Quarter	¹³⁷ Cs	1x10 ⁻¹	Bq/l
Jesenice (Želivka)	Drinking water	Activity concentration	Quarter	³ H	1x10 ⁰	Bq/l
				⁹⁰ Sr	6x10 ⁻²	
				¹³⁷ Cs	1x10 ⁻¹	
Ostrava – Martinov	Milk	Activity concentration	Quarter	¹³⁷ Cs	5x10 ⁻¹	Bq/l
				⁹⁰ Sr	2x10 ⁻¹	

				⁴⁰ K	1x10 ⁰	
Prague and Central Bohemian Region	Diversified diet	Activity per day ^{b)}	Quarter	¹³⁷ Cs	1x10 ⁻¹	Bq/d
				⁹⁰ Sr	1x10 ⁻¹	
				⁴⁰ K	1x10 ⁰	

Explanatory notes:

^{a)} Activity concentration shall mean a quotient of the activity and the concentration of the measured sample expressed in Bq/m³ or in Bq/l.

^{b)} Activity in one portion of diversified diet per day for 1 individual expressed in Becquerel per day (Bq/d).

Table 2: Details on the monitored items measured and evaluated in territorial network – normal monitoring

A. Monitored items characterising the external field of ionising radiation of sources					
Monitored item	Monitoring network	Measured physical quantity	Minimum number of measuring sites/monitoring routes	Length of the monitoring period or frequency of measurement	Range of measurement or lowest detectable value of the physical quantity to be measured
Air	Early Warning Network	Dose equivalent rate ^{a)}	60	10 minutes ^{b)}	50 nSv/h – 1 Sv/h
	Network of integral measurement	Dose equivalent converted into dose equivalent rate ^{c)}	180	Quarter	50 nSv/h (30 micro Sv/quarter)
	Network of instantaneous measurement	Dose rate	8	Month	50 nSv/h
	Network of spectrometry measurement	Energy-dependent spectrum ^{d)}	5	Month	Not determined
	Network of monitoring routes	Dose rate or dose equivalent rate	15 ^{e)} / 1 ^{f)}	Month/twice a year	50 nSv/h
B. Monitored items, in which the content of radionuclides is determined					
Monitored item	Measured physical quantity	Radionuclide, the content of which is determined	Minimum number of sampling sites	Length of the monitoring period or frequency of measurement	Lowest detectable value of the physical quantity to be measured
Network of ENVIRONMENTAL sampling					
Air – aerosols	Activity concentration ^{g)}	¹³⁷ Cs	10 ^{h)}	Week	1x10 ⁻⁶ Bq/m ³
		⁷ Be			1x10 ⁻³ Bq/m ³
		⁴⁰ K			1x10 ⁻⁴ Bq/m ³
		²¹⁰ Pb			1x10 ⁻⁴ Bq/m ³
Air – aerosols	Activity concentration	Total beta	10 ⁱ⁾	Quarter	1x10 ⁻⁴ Bq/m ³
		⁹⁰ Sr	1 ^{j)}		1x10 ⁻⁷ Bq/m ³

		$^{238}\text{Pu}, ^{239,240}\text{Pu}$	1 ^{j)}		$5 \times 10^{-9} \text{ Bq/m}^3$
Air – fallouts	Surface activity ^{k)}	^{137}Cs	8 ^{h)}	Month	0.1 Bq/m ²
		^7Be			1 Bq/m ²
		^{40}K			1 Bq/m ²
		^{210}Pb			1 Bq/m ²
Soils – soil and ground cover	Surface activity	^{137}Cs	8 ^{l)}	Year	10 Bq/m ²
	Specific activity ^{m)}	Natural radionuclides			10 Bq/kg
Soils – in situ	Surface activity	^{137}Cs	8 ⁿ⁾	Year	1000 Bq/m ²
	Specific activity	Natural radionuclides			100 Bq/kg
Water – surface water	Activity concentration	Total beta after deduction of ^{40}K	10	Quarter	0.05 Bq/l
		^{137}Cs		Quarter	0.1 Bq/l
		^{90}Sr		Year	0.05 Bq/l
		^3H		Quarter	2 Bq/l
Water – drinking water	Activity concentration	^{137}Cs	10	Quarter	0.1 Bq/l
		^{90}Sr			0.05 Bq/l
		^3H			2 Bq/l
Sludge – water-supply sludge	Specific activity	^{137}Cs	5	Year	1 Bq/kg
Sediments – sediments from watercourses	Specific activity	^{137}Cs	5	Year	1 Bq/kg
Network of FOOD CHAIN sampling					
Cow milk (powder, drinking, raw)	Activity concentration or specific activity	^{137}Cs	20	Quarter	0.1 Bq/l (Bq/kg)
		^{90}Sr			0.03 Bq/l
Diversified diet items – slaughter meat (beef, pork, poultry)	Specific activity	^{137}Cs	100	Year	0.1 Bq/kg
Diversified diet items – game meat	Specific activity	^{137}Cs	30	Year	0.1 Bq/kg
Diversified diet items – fish	Specific activity	^{137}Cs	20	Year	0.1 Bq/kg
Diversified diet items – root crops (potatoes)	Specific activity	^{137}Cs	10	Year	0.1 Bq/kg
Diversified diet items –	Specific activity	^{137}Cs	20	Year	0.1 Bq/kg

cereals					
Diversified diet items – vegetable	Specific activity	¹³⁷ Cs	20	Year	0.1 Bq/kg
Diversified diet items – fruit	Specific activity	¹³⁷ Cs	20	Year	0.1 Bq/kg
Diversified diet items – berries	Specific activity	¹³⁷ Cs	20	Year	0.1 Bq/kg
Diversified diet items – mushrooms	Specific activity	¹³⁷ Cs	30	Year	0.1 Bq/kg
Diversified diet – daily consumer basket	Activity per day ^{a)})	¹³⁷ Cs	20	Year	0.1 Bq/d
		⁹⁰ Sr	20		0.05 Bq/d
Feedstuffs	Specific activity	¹³⁷ Cs	20	Year	0.1 Bq/kg
Network of HUMAN BODY measurement					
Whole body	Activity	¹³⁷ Cs	30	Year	50 Bq
Excreta – urine	Activity per day ^{a)})	¹³⁷ Cs	70	Year	0.05 Bq/d

Explanatory notes:

- a) Photon or ambient dose equivalent rate.
- b) Meteorological information shall be transmitted from the selected measuring sites with a frequency of 1 hour.
- c) The dose equivalent for the quarter shall be converted into average photon or ambient dose equivalent rate per hour.
- d) Energy-dependent spectrum in counts per second.
- e) The surface monitoring route contains hundreds to thousands of measuring sites.
- f) The aerial monitoring route contains thousands of measuring sites.
- g) Activity concentration expressed in Bq/m³ or Bq/l.
- h) At least one sampling site is located in each monitoring area.
- i) The total beta activity concentration shall be measured in the aerosol filters from each sampling site.
- j) The content of this radionuclide shall be only measured in the aerosol filter in one sampling site.
- k) Surface activity shall mean a quotient of the activity and the area, expressed in Bq/m².
- l) In the framework of the exercise of mobile groups or as instructed by the Office by 30 September
- m) Specific activity shall mean a quotient of the activity and the mass, expressed in Bq/kg.
- n) Activity per day expressed as activity in Bq/d in one portion of daily diet for one person or activity in Bq/d in the sample of the excreta collected by one person for 24 hours.

TABLE 3: Details on the monitored items measured and evaluated in local networks – normal monitoring

Local network of the nuclear power installation

A. Monitored items characterising the external field of ionising radiation of sources					
Monitored item	Monitoring network	Measured physical quantity	Minimum number of measuring sites	Length of the monitoring period or frequency of measurement	Range of measurement or lowest detectable value of the physical quantity to be measured
Air	Early Warning Network – Teledosimetry System (TDS)	Dose equivalent rate ^{a)}	16 ^{b)} 16 ^{c)}	10 minutes	50 nSv/h – 1 Sv/h
	Network of integral measurement	Dose equivalent converted into dose equivalent rate ^{d)}	40 ^{e)}	Quarter	From 50 nSv/h (50 micro Sv/quarter)
	Network of instantaneous measurement	Dose rate	5 ^{f)}	Quarter	From 50 nSv/h
	Network of spectrometry measurement	Energy-dependent spectrum ^{g)}	5 ^{f)}	Quarter	Not determined
			1 ^{h)}	Year	
Network of monitoring routes	Dose rate or dose equivalent rate	2 ⁱ⁾	Quarter	From 50 nSv/h	
B. Monitored items, in which the content of radionuclides is determined					
Monitored item	Measured physical quantity	Radionuclide, the content of which is determined	Minimum number of sampling sites	Length of the monitoring period or frequency of measurement	Lowest detectable value of the physical quantity to be measured^{l)}
Network of ENVIRONMENTAL sampling					
Air – aerosols	Activity concentration	¹³⁷ Cs	5 ^{k)}	Week	1x10 ⁻⁵ Bq/m ³
		⁷ Be			1x10 ⁻³ Bq/m ³
		⁴⁰ K			1x10 ⁻⁴ Bq/m ³
		²¹⁰ Pb			1x10 ⁻⁴ Bq/m ³

Air – aerosols	Activity concentration	⁹⁰ Sr	1 ^{l)}	Quarter/year	1x10 ⁻⁶ Bq/m ³
		²³⁸ Pu and ^{239,240} Pu			1x10 ⁻⁷ Bq/m ³
Air – gaseous forms	Activity concentration	¹³¹ I	1 ^{m)}	Week	5x10 ⁻⁴ Bq/m ³
Discharges to the air	Activity concentration/activity	See Table 1 of Annex 6 hereto	1	Day, week, month, quarter, year ⁿ⁾	See Table 1 of Annex 6 hereto
Air – fallouts	Surface activity	¹³⁷ Cs	6 ^{o)}	Month	0.5 Bq/m ²
		⁷ Be			1 Bq/m ²
		⁴⁰ K			1 Bq/m ²
		²¹⁰ Pb			1 Bq/m ²
		Total beta			1 Bq/m ²
Soils – soil and ground cover	Surface activity/specific activity	¹³⁷ Cs	5 ^{p)}	Year	10 Bq/m ²
		Natural radionuclides			10 Bq/kg
		⁹⁰ Sr			10 Bq/kg
Soils – in situ	Surface activity/specific activity	¹³⁷ Cs	4	Quarter	1000 Bq/m ²
		Natural radionuclides	1 ^{q)}	Year	100 Bq/kg
Water – meteoric water	Activity concentration	³ H	3	Month	3 Bq/l
Water – surface water	Activity concentration	¹³⁷ Cs	10	Quarter	0.1 Bq/l
		⁹⁰ Sr		Year	0.05 Bq/l
		³ H		Month	3 Bq/l
		Total alpha		Quarter to year	0.1 Bq/l
		Total beta		Quarter to year	0.2 Bq/l
Water – drinking water	Activity concentration	¹³⁷ Cs	2 wells, 2 public water supply	Year	0.1 Bq/l
		³ H		Month	3 Bq/l
		⁹⁰ Sr		Year	0.05 Bq/l
Water – ground water	Activity concentration	¹³⁷ Cs	10	Year	0.1 Bq/l
		³ H		Month	3 Bq/l
Discharges to the watercourses	Activity concentration/activity	See Table 2 of Annex 6 hereto	1 ^{r)}	Month, quarter, year	See Table 2 of Annex 6 hereto
Network of FOOD CHAIN sampling					
Milk	Activity concentration or specific activity	¹³⁷ Cs	1	14 days	0.2 Bq/l
		⁹⁰ Sr	1	Quarter	
Diversified diet items – fish	specific activity	¹³⁷ Cs	1	Year	0.1 Bq/l
				Year	0.1 Bq/kg

Diversified diet items – crops ^{a)})	Specific activity	¹³⁷ Cs	2 1	Year Quarter	0.1 Bq/kg
Diversified diet items – cereals	Specific activity	¹³⁷ Cs	2	Year	0.1 Bq/kg
Diversified diet items – fruit	Specific activity	¹³⁷ Cs	1	Year	0.1 Bq/kg
Diversified diet items – berries	Specific activity	¹³⁷ Cs	1	Year	0.1 Bq/
Diversified diet items – mushrooms	Specific activity	¹³⁷ Cs	2	Year	0.1 Bq/kg
Feedstuffs	Specific activity	¹³⁷ Cs	2 1	Year Quarter	0.1 Bq/kg

Explanatory notes:

- a) Photon or ambient dose equivalent rate.
- b) Measuring points at the border of the guarded area, with at least one measuring site situated in a sector, the centre of which is located in the geometric centre of the nuclear power installation and the size of which is 22.5°.
- c) Measuring sites outside the guarded area in the emergency planning zone, with at least one measuring site situated in a sector, the centre of which is located in the geometric centre of the nuclear power installation and the size of which is 22.5°.
- d) The dose equivalent for the quarter shall be converted into average photon or ambient dose equivalent rate per hour.
- e) Measuring sites in the emergency planning zone, while the Office shall ensure the measurement and evaluation from 10 measuring sites.
- f) Measuring sites in the environmental radiation control stations.
- g) Energy-dependent spectrum in counts per second.
- h) The Office shall ensure the measurement and evaluation from one measuring site in the emergency planning zone.
- i) The surface monitoring route in the emergency planning zone contains hundreds to thousands of measuring sites; the operator of the nuclear power installation shall ensure the measurement on one route and the Office shall ensure the measurement on one route.
- j) The lowest detectable values of natural radionuclides referred to in this Table do not apply to the environmental monitoring of nuclear power installation ensured by the holder of the licence to operate such installation.
- k) One sampling site in the guarded area and the others in the emergency planning zone in the environmental radiation control stations, in which case the pooled sample from all sampling sites of one nuclear power installation site shall be measured; the individual aerosol filters shall be only measured in excess of the monitoring level.
- l) Pooled sample of weekly samplings from all sampling sites for the period.
- m) Selected sampling site in the environmental radiation control station in the emergency planning zone.
- n) Information for discharges and the results of balance measurements shall be transmitted in the format agreed by the Office in daily, weekly, monthly, quarterly and annual reports, including standardised information pursuant to Table 5 of Annex 6 hereto.
- o) The operator of nuclear power installation shall measure the pooled sample from more than one sampling site; the Office shall ensure the sampling and measurement at least from two sampling sites in the emergency planning zone.

- p) Sampling sites in the environmental radiation control stations; Sr shall be only measured in the pooled sample from all sampling sites; the Office shall ensure the sampling and measurement from one site in the emergency planning zone.
- q) The Office shall ensure the measurement in one site in the emergency planning zone.
- r) Information for discharges and the results of balance measurements shall be transmitted in the format agreed by the Office in monthly, quarterly and annual reports, including standardised information pursuant to Table 6 of Annex 6 hereto.
- s) With the aerial part fed.

TABLE 4: Details on the monitored items measured and evaluated in local networks – normal monitoring

Local network of other nuclear installations ^{a)}, category IV workplaces, which are not a nuclear installation^{a)}, and category III workplaces^{a)}, except heap, sludge bed or any other residues from the practices associated with the extraction of radioactive mineral or from any other mining practices associated with the occurrence of radioactive mineral.

A. Monitored items characterising the external field of ionising radiation of sources					
Monitored item	Monitoring network	Measured physical quantity	Minimum number of measuring sites	Length of the monitoring period or frequency of measurement	Range of measurement or lowest detectable value of the physical quantity to be measured
Air	Network of integral measurement	Dose equivalent converted into dose equivalent rate ^{b)}	4	Quarter	From 50 nSv/h (50 micro Sv/quarter)

B. Monitored items, in which the content of radionuclides is determined					
Monitored item	Measured physical quantity	Radionuclide, the content of which is determined	Minimum number of sampling sites	Length of the monitoring period or frequency of measurement	Lowest detectable value of the physical quantity to be measured
Network of ENVIRONMENTAL sampling					
Air – aerosols	Activity concentration	¹³⁷ Cs	1	Week	3x10 ⁻⁶ Bq/m ³
Discharges to the air – aerosols	Activity concentration/activity	¹³⁷ Cs	1	Week, year ^{c)}	3x10 ⁻⁶ Bq/m ³
Discharges to the air – noble gases	Activity concentration/activity	⁴¹ Ar	1	Continuously, year ^{c)}	1x10 ⁴ Bq/m ³
Discharges to the air – gaseous forms	Activity concentration/activity	¹³¹ I	1	Week, year ^{c)}	5x10 ⁻⁴ Bq/m ³
Discharges to the air – tritium	Activity concentration/activity	³ H	1	Week, year ^{c)}	1x10 ³ Bq/m ³
Discharges to the air – carbon	Activity concentration/activity	¹⁴ C	1	Week, year ^{c)}	1x10 ¹ Bq/m ³
Air – fallouts	Surface activity	¹³⁷ Cs	1	Month	0.1 Bq/m ²
Water – surface water	Activity concentration	¹³⁷ Cs	2 ^{d)}	Quarter	0.1 Bq/l

		^3H			3 Bq/l
Water – ground water	Activity concentration	^{137}Cs	4	Year	0.1 Bq/l
		^3H		Month	3 Bq/l
Discharges to the watercourses	Activity concentration/activity	^{137}Cs	1	Month, year ^{e)}	0.1 Bq/l
		^3H			3 Bq/l

Explanatory notes:

- a) For nuclear installations and category IV workplaces, which are not a nuclear installation, which demonstrably neither produce gaseous or liquid discharges, nor release discharges into the environment, the differentiated approach applies. For category III workplaces, the nuclide characteristic of the discharge in question shall be monitored in discharges.
- b) The dose equivalent for the quarter shall be converted into average photon or ambient dose equivalent rate per hour.
- c) Information for discharges and the results of balance measurements shall be transmitted in the format agreed by the Office in annual reports.
- d) The Office shall ensure the sampling and measurement from one sampling site before the waste water system admission and from another sampling site under the waste water system admission.

TABLE 5: Details on the monitored items measured and evaluated in territorial and border networks – accident monitoring

A. Monitored items characterising the external field of ionising radiation of sources					
Monitored item	Monitoring network	Measured physical quantity	Minimum number of measuring sites until determination pursuant to § 149(3) of the Atomic Act	Length of the monitoring period or frequency of measurement until determination pursuant to § 149(3) of the Atomic Act	Range of measurement or lowest detectable value of the physical quantity to be measured
Air	Early Warning Network	Dose equivalent rate	60	10 minutes ^{a)}	50 nSv/h – 1 Sv/h
	Network of integral measurement	Dose equivalent converted into dose equivalent rate	180	3 months ^{b)}	From 50 nSv/h
	Network of instantaneous measurement	Dose rate	Only after determination of the extent and the method of involvement	Only after determination of the extent and the method of involvement	50 nSv/h – 1 Sv/h
	Network of spectrometry measurement	Energy-dependent spectrum	5	Only after determination of the extent and the method of involvement	Not determined
	Network of monitoring routes	Dose rate or dose equivalent rate	Only after determination of the extent and the method of involvement	Only after determination of the extent and the method of involvement	50 nSv/h – 1 Sv/h

B. Monitored items, in which the content of radionuclides is determined					
Monitored item	Measured physical quantity	Radionuclide, the content of which is determined	Minimum number of sampling sites until determination pursuant to § 149(3) of the Atomic Act	Length of the monitoring period or frequency of measurement until determination pursuant to § 149(3) of the Atomic Act	Lowest detectable value of the physical quantity to be measured^{e)}
Network of ENVIRONMENTAL sampling					
Air – aerosols	Activity concentration	Radionuclides detected ^{d)}	10	24 hours	1×10^{-5} Bq/m ³ for ¹³⁷ Cs
Air – gaseous forms	Activity concentration	¹³¹ I	10	24 hours	1×10^{-4} Bq/m ³
Air – fallouts (including rainwater and snow)	Surface activity/activity concentration	Radionuclides detected	8	168 hours	1 Bq/m ² for ¹³⁷ Cs
Soils – soil and ground cover	Surface activity	Radionuclides detected	0 ^{e)}	Only after determination of the extent and the method of involvement	100 Bq/m ² for ¹³⁷ Cs
Soils – ground cover and snow	Surface activity	Radionuclides detected	0	Only after determination of the extent and the method of involvement	100 Bq/m ² for ¹³⁷ Cs
Soils – in situ	Surface activity	Radionuclides detected	0	Only after determination of the extent and the method of involvement	1000 Bq/m ² for ¹³⁷ Cs
Water – surface water	Activity concentration	Radionuclides detected	0	168 hours	10 Bq/l for ¹³⁷ Cs and ¹³¹ I, 50 Bq/l for ³ H

Water – drinking water	Activity concentration	Radionuclides detected	0	168 hours	10 Bq/l for ¹³⁷ Cs and ¹³¹ I, 50 Bq/l for ³ H
Network of FOOD CHAIN sampling					
Milk ^{f)}	Activity concentration or specific activity	Radionuclides detected	0	24 hours	10 Bq/l for ¹³⁷ Cs and ¹³¹ I
Diversified diet items ^{g)}	Specific activity	Radionuclides detected	0	168 hours	10 Bq/kg for ¹³⁷ Cs and ¹³¹ I
Diversified diet – daily diet – consumer basket	Activity per day	¹³⁷ Cs, ¹³¹ I, ⁹⁰ Sr	20	Only after determination of the extent and the method of involvement	10 Bq/kg for ¹³⁷ Cs and ¹³¹ I
Feedstuffs (aerial part fed)	Specific activity	Radionuclides detected	0	168 hours	10 Bq/kg for ¹³⁷ Cs and ¹³¹ I
Medicinal herbs, imported foodstuffs, other monitored items ^{h)}	Specific activity	Radionuclides detected	0	Only after determination of the extent and the method of involvement	10 Bq/kg for ¹³⁷ Cs and ¹³¹ I
Network of HUMAN BODY measurement					
Whole body	Activity	¹³⁷ Cs, radionuclides detected	0	24 hours	100 Bq for ¹³⁷ Cs
Selected organs – thyroid gland	Activity	¹³¹ I	0	24 hours	500 Bq
Body surface ⁱ⁾	Surface activity/ surface contamination ^{l)}	Radionuclides detected	0	Only after determination of the extent and the method of involvement	10 Bq/cm ²
Network of closures					
Surface of animal body, buildings, objects ⁱ⁾	Surface activity/ surface contamination	Radionuclides detected	0	Only after determination of the extent and the method of	10 Bq/cm ²

				involvement	
--	--	--	--	-------------	--

Explanatory notes:

- a) Meteorological information shall be transmitted from the selected measuring sites with a frequency of 1 hour.
- b) The period can be shortened as needed; the measurement serves to specify doses in the emergency exposure situation.
- c) The lowest detectable value of measured physical quantity during measurement at 30% of HPGe detector for 300 seconds for the sample with a weight of 500 grams is achievable at the level of 10 Bq/kg or Bq/l.
- d) Radionuclides may be different depending on the place and course of emergency exposure situation.
- e) The zero in the column "Minimum number of sampling points" indicates that the sampling sites will be included in the determination of the extent and method of involvement.
- f) Preferably raw or drinking milk.
- g) The diversified diet items will be included in the determination of the extent and method of involvement by season, by the emergency exposure situation occurred and the expected contamination of individual items.
- h) The other monitored items will be included in the determination of the extent and method of involvement by season, by the emergency exposure situation occurred and the expected contamination of individual items.
- i) Measurement in the collection points set up, where appropriate, at the borders of the Czech Republic, or at the border of the closed area, affected by emergency exposure situation.
- j) Surface contamination shall mean a surface activity expressed in Bq/cm².

TABLE 6: Details on the monitored items measured and evaluated in local networks – accidental monitoring

Local network of the nuclear power installation

A. Monitored items characterising the external field of ionising radiation of sources					
Monitored item	Monitoring network	Measured physical quantity	Minimum number of measuring sites until determination pursuant to § 149(3) of the Atomic Act	Length of the monitoring period or frequency of measurement until determination pursuant to § 149(3) of the Atomic Act	Range of measurement or lowest detectable value of the physical quantity to be measured
Air	Early Warning Network – Teledosimetry System (TDS)	Dose equivalent rate	16 ^{a)} 16 ^{b)}	10 minutes	50 nSv/h – 1 Sv/h
	Network of integral measurement	Dose equivalent converted into dose equivalent rate	40	3 months ^{c)}	From 50 nSv/h
	Network of instantaneous measurement	Dose rate	0	2 hours	From 50 nSv/h
	Network of spectrometry measurement	Energy-dependent spectrum	0	Only after determination of the extent and the method of involvement	Not determined
	Network of monitoring routes	Dose rate or dose equivalent rate	16 ^{d)}	6 hours	From 50 nSv/h

B. Monitored items, in which the content of radionuclides is determined					
Monitored item	Measured physical quantity	Radionuclide, the content of which is determined	Minimum number of sampling sites until determination pursuant to § 149(3) of the Atomic Act	Length of the monitoring period or frequency of measurement until determination pursuant to § 149(3) of the Atomic Act	Lowest detectable value of the physical quantity to be measured
Network of ENVIRONMENTAL sampling					
Air – aerosols	Activity concentration	Radionuclides detected ^{e)}	5	6 hours	0.1 Bq/m ³
Air – gaseous forms	Activity concentration	¹³¹ I	1	6 hours	0.1 Bq/m ³
Air – fallouts (including meteoric water and snow)	Surface activity/activity concentration	Radionuclides detected	5	168 hours	0.5 Bq/m ²
Soils – soil and ground cover or, where appropriate, ground cover and snow	Surface activity/specific activity	Radionuclides detected	1	6 hours	10 Bq/kg
Soils – in situ	Surface activity	Radionuclides detected	5	Only after determination of the extent and the method of involvement	500 Bq/m ²
Water – surface water	Activity concentration	Radionuclides detected	1 ^{f)}	6 hours	5 Bq/l for ¹³⁷ Cs 20 Bq/l for ³ H
Water – drinking water	Activity concentration	Radionuclides detected	0 ^{g)}	6 hours	5 Bq/l for ¹³⁷ Cs 20 Bq/l for ³ H
Discharges to the air ^{h)}					See Table 1 of Annex 6 hereto
Discharges to the watercourses ^{h)}					See Table 2 of Annex 6 hereto
Network of FOOD CHAIN sampling					
Milk	Activity concentration	Radionuclides detected	1	12 hours	5 Bq/l
Diversified diet items ⁱ⁾	Specific activity	Radionuclides detected	0	Only after determination of the extent and the method of	10 Bq/kg

				involvement	
Feedstuffs (aerial part fed)	Specific activity	Radionuclides detected	1	12 hours	10 Bq/kg

Explanatory notes:

- a) Measuring sites at the border of the guarded area, with at least one measuring site situated in a sector, the centre of which is located in the geometric centre of the nuclear power installation and the size of which is 22.5°.
- b) Measuring sites outside the guarded area in the emergency planning zone, with at least one measuring site situated in a sector, the centre of which is located in the geometric centre of the nuclear power installation and the size of which is 22.5°.
- c) The period can be shortened as needed; the dosimeters are replaced at the end of leakage.
- d) There are 16 monitoring routes in the emergency planning zone, each of which covering one sector of approximately 22.5°, depending on the wind direction; the endangered sections are monitored.
- e) Radionuclides may be different depending on the place and course of emergency exposure situation.
- f) Sampling site under the waste channel admission.
- g) The zero in the column “Minimum number of sampling sites” indicates that the sampling sites will be included in the determination of the extent and method of involvement, and they will be determined operatively according to the expected or actual leakage.
- h) During extraordinary event associated with the leakage, discharges to the air and to the watercourses shall be monitored according to the monitoring programme for discharges for accidental monitoring.
- i) The diversified diet items will be included in the determination of the extent and method of involvement by season, by crop planning, by the emergency exposure situation occurred and the expected contamination of individual items

TABLE 7: Details on the monitored items measured and evaluated in local networks – accidental monitoring

Local network of other nuclear installations^{a)}, category IV workplaces, which are not a nuclear installation^{a)}, and category III workplaces^{a)}, except heap, sludge bed or any other residues from the practices associated with the extraction of radioactive mineral or from any other mining practices associated with the occurrence of radioactive mineral.

A. Monitored items characterising the external field of ionising radiation of sources					
Monitored item	Monitoring network	Measured physical quantity	Minimum number of measuring sites until determination pursuant to § 149(3) of the Atomic Act	Length of the monitoring period or frequency of measurement until determination pursuant to § 149(3) of the Atomic Act	Range of measurement or lowest detectable value of the physical quantity to be measured
Air	Network of integral measurement	Dose equivalent converted into dose equivalent rate ^{b)})	4	Quarter	From 50 nSv/h (50 micro Sv/quarter)
	Network of monitoring routes	Dose rate or dose equivalent rate	1	6 hours	From 50 nSv/h
	Network of instantaneous measurement	Dose rate	0	Only after determination of the extent and the method of involvement	From 50 nSv/h
	Network of spectrometry measurement	Energy-dependent spectrum	0	Only after determination of the extent and the method of involvement	Not determined

B. Monitored items, in which the content of radionuclides is determined					
Monitored item	Measured physical quantity	Radionuclide, the content of which is determined	Minimum number of sampling sites until determination pursuant to § 149(3) of the Atomic Act	Length of the monitoring period or frequency of measurement until determination pursuant to § 149(3) of the Atomic Act	Lowest detectable value of the physical quantity to be measured
Network of ENVIRONMENTAL sampling					
Air – aerosols	Activity concentration	Radionuclides detected ^{c)}	1	6 hours	0.1 Bq/m ³
Air – gaseous forms	Activity concentration	¹³¹ I	1	6 hours	0.1 Bq/m ³
Air – fallouts (including meteoric water and snow)	Surface activity/activity concentration	Radionuclides detected	1	168 hours	0.5 Bq/m ²
Soils – soil and ground cover or, where appropriate, ground cover and snow	Surface activity/specific activity	Radionuclides detected	1	6 hours	10 Bq/kg
Soils – in situ	Surface activity	Radionuclides detected	1	Only after determination of the extent and the method of involvement	500 Bq/m ²
Water – surface water	Activity concentration	Radionuclides detected	1 ^{d)}	6 hours	5 Bq/l for ¹³⁷ Cs 20 Bq/l for ³ H
Water – drinking water	Activity concentration	Radionuclides detected	0 ^{e)}	6 hours	5 Bq/l for ¹³⁷ Cs 20 Bq/l for ³ H
Discharges to the air ^{f)}	Activity concentration/activity				
Discharges to the watercourses ^{f)}	Activity concentration/activity				

Explanatory notes:

- a) Nuclear installations and category IV workplaces, which are not a nuclear installation, which demonstrably neither produce gaseous or liquid discharges, nor release discharges into the environment, and category III workplaces shall carry out emergency monitoring according to the instructions of the Office.
- b) The dose equivalent for the quarter shall be converted into average photon or ambient dose equivalent rate per hour.
- c) Radionuclides may be different depending on the place and course of emergency exposure situation.
- d) Sampling site under the waste channel admission.
- e) The zero in the column “Minimum number of sampling sites” indicates that the sampling sites will be included in the determination of the extent and method of involvement, and they will be determined operatively according to the expected or actual leakage.
- f) During extraordinary event associated with the leakage, discharges to the air and to the watercourses shall be monitored according to the monitoring programme for discharges for accidental monitoring; the lowest detectable values of measured physical quantity correspond to the values for normal monitoring, referred to in Table 4 of this Annex.

TABLE 8: Details on the monitored items measured and evaluated in local networks – normal monitoring

Local network of the heap, sludge bed or any other residues from the practices associated with the extraction of radioactive mineral or from any other mining practices associated with the occurrence of radioactive mineral

A. Monitored items characterising the external field of ionising radiation of sources					
Monitored item	Monitoring network	Measured physical quantity	Minimum number of measuring sites	Length of the monitoring period or frequency of measurement	Range of measurement or lowest detectable value of the physical quantity to be measured
Air	Network of integral measurement	Dose equivalent converted into dose equivalent rate ^{a)}	1	Quarter	From 50 nSv/h
		Radon equivalent equilibrium concentration ^{b),c)}	1	Month	5 Bq/m ³
B. Monitored items, in which the content of radionuclides is determined					
Monitored item	Measured physical quantity	Radionuclide, the content of which is determined	Minimum number of sampling sites	Length of the monitoring period or frequency of measurement	Lowest detectable value of the physical quantity to be measured
Network of ENVIRONMENTAL sampling					
Air – aerosol ^{c)}	Total activity concentration	Mixture of long-lived radionuclides of uranium-radium decay chain	1	Month	0.001 Bq/m ³
Water – ground water ^{d)}	Activity concentration	U _{nat}	1	Quarter ^{e)}	0.75 Bq/l
		²²⁶ Ra		Year	0.05 Bq/l
Discharges to the watercourses	Activity concentration	U _{nat}	e)	Week ^{e)}	0.75 Bq/l
		²²⁶ Ra		Month ^{f)}	0.05 Bq/l

Discharges to the air ^{e)} §)	Activity concentration	U _{nat}	e)	Quarter	1 Bq/m ³
		²²⁶ Ra			1 Bq/m ³
		Mixture of long-lived radionuclides of uranium-radium decay chain ^{e)}			0.001 Bq/m ³
		²²² Rn ^{h)}			200 Bq/m ³
		²²² Rn (EOAR) ^{b)} e)j)			5 Bq/m ³
Water – surface water ^{j)}	Activity concentration	U _{nat}	1	Year	0.75 Bq/l
		²²⁶ Ra			0.05 Bq/l

- a) The dose equivalent for the quarter shall be converted into average photon or ambient dose equivalent rate per hour. If in the place where the local network in question is located any activity associated with the extraction of radioactive mineral is no longer carried out, the control performed by a portable instrument once a year is sufficient.
- b) Radon equivalent equilibrium concentration of ²²²Rn is the weighted sum of the polonium activity concentration of ²¹⁸Po, lead activity concentration of ²¹⁴Pb and bismuth activity concentration of ²¹⁴Bi, determined on the basis of integral measurement by a film-stop detector.
- c) Category III workplace where the activity associated with the extraction of radioactive mineral is carried out and where the decommissioning procedure has not been completed.
- d) In boreholes or wells.
- e) All sites with the permitted discharges in the local network in question shall be monitored.
- f) Discharges to the watercourses from category III workplace where the activity associated with the extraction of radioactive mineral is carried out (mine water treatment plants for mine water from already closed deposits).
- §) The radionuclide characterising the discharge in question shall be monitored.
- h) Pit banks, discharge ducts from ventilation stations.
- i) The conversion to the surface of sludge bed shall be carried out.
- j) Contaminated sites (heaps, galleries, sludge beds).

Content of the record of sampling and the record of measurement

TABLE 1 – Record^{a)} of sampling

A	Sampling specification	1	Purpose of sampling	
		2	Required determination	
		3	Receiving measurement laboratory	
B	Description of the sample	1	Monitored item	
		2	Additional information on the sample	
		3	Treatment of sample (during sampling)	
		4	Amount of the sample taken (including unit)	
		5	Other additional information	
C	Date and time^{b)}	1	Date of sampling (DD.MM.YY)	
		2	Local time of sampling (hh:mm)	
		3	Start date and time of sampling	
		4	End date and time of sampling	
		5	Length of sampling (in hours)	
		6	Other additional information	
D	Site	1	Name of site	
		2	Longitude in degrees and minutes or in decimal degrees (WGS84)	
		3	Latitude in degrees and minutes or in decimal degrees (WGS84)	
		4	Additional information of the site ^{c)}	
		5	Other additional information	

E	Sample submission	1	Surname, name or names of the natural person who took the sample, including contact details (telephone/e-mail) and signature	
		2	Surname, name or names of the natural person ^{d)} who made the record, including contact details (telephone/e-mail) and signature	
		3	Surname, name or names of the natural person who took over the sample taken, including contact details (telephone/e-mail) and signature	
		4	Date of submission	
		5	Number (identifier) assigned to the sample by the measurement laboratory ^{e)}	
		6	Other additional information	

Explanatory notes:

- a) Other information may be added in the record of sampling, in the form of additional notes in single rows or by adding the rows. Part A. shall be completed by the party ordering the sampling; Parts B., C., D., and rows E.1 and E.2 shall be completed by the party taking the sample; row E.3 and the rest shall be completed on sample handover to/takeover by the measurement laboratory. Pursuant to § 10(3) c) hereof, the measurement laboratory shall transmit to the Data Centre the information referred to in rows B.1, appropriate time data by the type of sampling from Part C., as well as rows D.1, D.2, D.3 and E.5. The measurement laboratory shall transmit the given information in the IRIX format.
- b) In Part C., the appropriate information shall be entered depending whether the sampling was continuous or site; for continuous sampling, it is possible to make an entry in rows C.3 and C.4 or C.3 and C.5.
- c) For example, river basin (for surface waters: name of the river, lake, reservoir or sea), description of the site, etc.
- d) Only if it differs from the natural person in row E.1.
- e) A unique identification of the sample in the measurement laboratory.

TABLE 2 – Record^{a)} of measurement

A	Laboratory	1	Name of measurement laboratory				
		2	Address of laboratory				
B	Receipt and processing of sample	1	Receipt date of sample				
		2	Sample identifier ^{b)} (assigned by the measurement laboratory)				
		3	Processing of sample ^{c)}				
C	Measurement data	1	Method of measurement				
		2	Measuring device (type) / verified (yes/no) ^{d)}				
		3	Date and time of measurement				
		4	Duration of measurement				
		5	Amount of the sample measured (including unit)				
		6	Measurement identification (identifier, spectrum number)				
		7	Measured quantity (activity concentration, specific activity)				
		8	Type of uncertainty (combined, standard)				
D	Measurement results		Radionuclide	Value	Uncertainty	Unit	Note^{e)}
		1 ^{f)}				
		2	Reference date and time ^{g)}		(DD.MM.YY hh:mm)		
		3	Other additional information				
E	Contact details	1	Surname, name or names of the natural person who				

			made the record, including contact details (telephone/e-mail) and signature	
--	--	--	-----------------------------------------------------------------------------	--

Explanatory notes:

- a) Other information may be added in the record of measurement, in the form of additional notes in single rows or by adding the rows. Pursuant to Section 10(3) c) hereof, the measurement laboratory shall transmit to the Data Centre the information referred to in rows A.1, B.2, C.1, C.7, D.1, D.2, in which case row D.1 shall be provided for all the radionuclides detected/required. The measurement laboratory shall transmit the given information in the IRIX format.
- b) A unique identification of the sample in the measurement laboratory.
- c) When preparing a sample for measurement, the sample or its part shall be placed in measuring vessels or measuring fixtures, either unprepared or processed.
- d) If the measuring device is subject to the verification pursuant to Act No. 505/1990 Coll., on Metrology, as amended.
- e) The values of the lowest significant activity (NVA) shall be indicated, if the measured value is less than NVA.
- f) Rows shall be added for all the radionuclides detected/required.
- g) Reference date is the date (or, where appropriate, the time for measurement during emergency exposure situation) to which the measured value refers.

Annex 5 to Decree No. 360/2016 Coll.

Content of the annual monitoring report of discharges and the surrounding areas

1. INTRODUCTION

2. SYMBOLS, ABBREVIATIONS AND DEFINITIONS USED

3. MONITORING OF DISCHARGES

3.1 Extent of ensuring the monitoring of discharges

3.1.1 Discharges to the air

3.1.2 Discharges to the watercourses

3.2 Results of the monitoring of discharges

3.2.1 Monitoring of gaseous discharges

3.2.1.1 *Results of the activity measurement of radionuclides*

3.2.1.2 *Results of the measurement expressed in effective dose*

3.2.1.3 *Overview of the exceeding of reference levels in the monitoring of discharges to the air*

3.2.1.4 *Standardised information for the release of radionuclides to the environment in the form of discharges to the air (pursuant to Annex 6 hereto)*

3.2.1.5 *Tables and graphs of the results of the monitoring of discharges to the air*

3.2.2 Monitoring of liquid discharges

3.2.2.1 *Results of the activity measurement of radionuclides*

3.2.2.2 *Results of the measurement expressed in effective dose*

3.2.2.3 *Overview of the exceeding of reference levels in the monitoring of discharges to the watercourses*

3.2.2.4 *Standardised information for the release of radionuclides to the environment in the form of discharges to the watercourses (pursuant to Annex 6 hereto)*

3.2.2.5 *Tables and graphs of the results of the monitoring of discharges to the watercourses*

3.2.3 Evaluation of the results of the monitoring of discharges

3.2.3.1 *Entry into the authorised limit*

3.2.3.2 *Tables and graphs for the entry into the authorised limit*

4. RADIATION EXPOSURE TO THE GENERAL PUBLIC IN THE VICINITY OF A NUCLEAR INSTALLATION caused by discharges

4.1 List of 50 annual committed effective dose

4.2 Maximum individual committed effective dose from discharges to the air

4.3 Maximum individual committed effective dose from discharges to the watercourses

5. SURROUNDING AREAS AL MONITORING OF A NUCLEAR INSTALLATION

5.1 Extent of ensuring the surrounding areas al monitoring of a nuclear installation

5.1.1 Monitoring networks for external exposure

5.1.1.1 *Early Warning Network*

5.1.1.2 *Network of integral measurement*

5.1.1.3 *Network of instantaneous measurement*

5.1.1.4 *Network of spectrometry measurement*

5.1.2 Monitoring networks for external and internal exposure

5.1.2.1 *Monitored items of the environment*

5.1.3 Monitoring networks for internal exposure

5.1.3.1 *Monitored items of the food chain*

5.2 RESULTS OF THE SURROUNDING AREAS AL MONITORING

5.2.1 Results of the measurement of dose rates

5.2.2 Results of the measurement of the content of radionuclides in monitored items of the environment and food chain

5.2.3 Overview of the exceeding of reference levels in surrounding areas al monitoring

5.2.4 Tables and graphs of the results of surrounding areas al monitoring

5.3 Evaluation of the results of surrounding areas al monitoring

6. ASSESSMENT OF THE IMPACT OF A NUCLEAR INSTALLATION ON RADIATION SITUATION IN ITS VICINITY

7. CONCLUSION

Requirements for data transmitted to nuclear installations

Table 1: Overview of radionuclides released from nuclear power reactors during their normal operation and requirements for the lowest detectable activity concentration for discharges to the air

Radionuclides and their list	Key radionuclides	Lowest detectable activity concentration (Bq/m ³)
Kryptons: ⁸⁵ Kr, ^{85m} Kr, ⁸⁷ Kr, ⁸⁸ Kr, ⁸⁹ Kr	⁸⁵ Kr	1x10 ⁴
Xenons: ^{131m} Xe, ¹³³ Xe, ^{135m} Xe, ¹³⁵ Xe, ¹³⁷ Xe, ¹³⁸ Xe	¹³³ Xe	1x10 ⁴
Cobalts: ⁵⁸ Co, ⁶⁰ Co	⁶⁰ Co	1x10 ⁻²
Strontiums: ⁸⁹ Sr, ⁹⁰ Sr	⁹⁰ Sr	2x10 ⁻²
Caesiums: ¹³⁴ Cs, ¹³⁷ Cs	¹³⁷ Cs	3x10 ⁻²
Plutoniums: ²³⁸ Pu, ²³⁹ Pu + ²⁴⁰ Pu	²³⁹ Pu + ²⁴⁰ Pu	5x10 ⁻³
Americium: ²⁴¹ Am	²⁴¹ Am	5x10 ⁻³
Alpha-emitting radionuclides	Total alpha activity ^{a)}	1x10 ⁻²
Iodines: ¹³¹ I, ¹³² I, ¹³³ I, ¹³⁵ I	¹³¹ I	2x10 ⁻²
Tritium: ³ H	³ H	1x10 ³
Carbon: ¹⁴ C	¹⁴ C	1x10 ¹

Explanatory note:

^{a)} It shall be only specified if it is impossible to determine the individual alpha-emitting radionuclides referred to in Table.

TABLE 2: Overview of radionuclides released from nuclear power reactors during their normal operation and requirements for the lowest detectable activity for discharges to the watercourses

Radionuclides and their list	Key radionuclides	Lowest detectable activity concentration (Bq/m ³)
Tritium: ³ H	³ H	1x10 ⁵
Cobalts: ⁵⁸ Co, ⁶⁰ Co	⁶⁰ Co	1x10 ⁴
Strontiums: ⁸⁹ Sr, ⁹⁰ Sr	⁹⁰ Sr	1x10 ³
Caesiums: ¹³⁴ Cs, ¹³⁷ Cs	¹³⁷ Cs	1x10 ⁴
Plutoniums: ²³⁸ Pu, ²³⁹ Pu + ²⁴⁰ Pu	²³⁹ Pu + ²⁴⁰ Pu	6x10 ³
Americium: ²⁴¹ Am	²⁴¹ Am	5x10 ¹
Alpha-emitting radionuclides	Total alpha activity ^{a)}	1x10 ³

Explanatory note:

^{a)} It shall be only specified if it is impossible to determine the individual alpha-emitting radionuclides referred to in Table.

TABLE 3: Overview of radionuclides released from spent nuclear fuel reprocessing plants during their normal operation and requirements for the lowest detectable activity concentration for discharges to the air

Radionuclides and their list	Key radionuclides	Lowest detectable activity concentration (Bq/m ³)
Kryptons: ⁸⁵ Kr	⁸⁵ Kr	1x10 ⁴
Cobalts: ⁶⁰ Co	⁶⁰ Co	3x10 ⁻²
Strontiums: ⁹⁰ Sr	⁹⁰ Sr	2x10 ⁻²
Rubidiums: ¹⁰⁶ Ru	¹⁰⁶ Ru	3x10 ⁻²
Caesiums: ¹³⁴ Cs, ¹³⁷ Cs	¹³⁷ Cs	3x10 ⁻²
Plutoniums: ²³⁸ Pu, ²³⁹ Pu + ²⁴⁰ Pu	²³⁹ Pu + ²⁴⁰ Pu	1x10 ⁻³
Iodines: ¹²⁹ I	¹²⁹ I	2x10 ⁰
Tritium: ³ H	³ H	1x10 ³
Carbon: ¹⁴ C	¹⁴ C	1x10 ¹

TABLE 4: Overview of radionuclides released from spent nuclear fuel reprocessing plants during normal operation and requirements for the lowest detectable activity for discharges to the watercourses

Radionuclides and their list	Key radionuclides	Lowest detectable activity concentration (Bq/m ³)
Tritium: ³ H	³ H	
Cobalts: ⁵⁷ Co, ⁵⁸ Co, ⁶⁰ Co	⁶⁰ Co	1x10 ⁴
Strontiums: ⁸⁹ Sr, ⁹⁰ Sr	⁹⁰ Sr	1x10 ³
Plutoniums: ²³⁸ Pu, ²³⁹ Pu + ²⁴⁰ Pu	²³⁹ Pu + ²⁴⁰ Pu	6x10 ³
Curiums: ²⁴² Cm, ²⁴³ Cm, ²⁴⁴ Cm	²⁴² Cm	6x10 ³
Uranium ^a)		

Explanatory note:

^a) The amount of uranium can be expressed in kg.

Table 5: Content of standardised information for the release to the environment in the form of discharges to the air of radionuclides released from nuclear reactors and from spent nuclear fuel reprocessing plants during their normal operation

Gaseous discharges			
Reactor: (place, reactor type)		Monitoring period:	
Volume of air released for that period (m ³):			
Radionuclide	Maximum value of the lowest detectable activity concentration for the relevant key radionuclide ^a (Bq/m ³)	Total activity discharged (Bq) ^b	Comments ^c
Noble gases			
⁴¹ Ar			
⁸⁵ Kr			
^{85m} Kr			
⁸⁷ Kr			
⁸⁸ Kr			
⁸⁹ Kr			
^{131m} Xe			
¹³³ Xe			
^{133m} Xe			
¹³⁵ Xe			
^{135m} Xe			
¹³⁷ Xe			
¹³⁸ Xe			
Aerosols			
⁵¹ Cr			
⁵⁴ Mn			
⁵⁸ Co			
⁵⁹ Fe			
⁶⁰ Co			
⁶⁵ Zn			
⁸⁹ Sr			
⁹⁰ Sr			
⁹⁵ Zr			
⁹⁵ Nb			
^{110m} Ag			
¹²² Sb			
¹²⁴ Sb			
¹²⁵ Sb			
¹³⁴ Cs			
¹³⁷ Cs			
¹⁴⁰ Ba			
¹⁴⁰ La			
¹⁴¹ Ce			
¹⁴⁴ Ce			
²³⁸ Pu			
²³⁹ Pu + ²⁴⁰ Pu			

²⁴¹ Am			
²⁴² Cm			
²⁴³ Cm			
²⁴⁴ Cm			
Total alpha activity ^{d)}			
Iodines			
¹³¹ I			
¹³² I			
¹³³ I			
¹³⁵ I			
Tritium			
³ H			
Carbon			
¹⁴ C			

Explanatory notes:

^{a)} Key radionuclide pursuant to Table 1 or Table 3 of this Annex.

^{b)} In the event that at least one activity measurement for a particular radionuclide will be higher than the lowest significant activity (NVA) during the year, then all other activity measurements with the result less than NVA will be conservatively estimated one half of the NVA value and the activity of that radionuclide will be reported in this overview of discharges as the sum of all values greater than NVA and the values equal to one half of NVA for all activity measurements with the result lesser than NVA. If all values of a particular radionuclide are less than NVA for a full year, then the resulting activity of that radionuclide will be reported as zero (it will be marked with the symbol “<DL” in Table; DL = detection limit).

^{c)} The comments are stated for cases where the balances are predetermined by calculation, for cases where the agreed substitute values are used in balancing instead of the values less than the lowest detectable activity (NDA); the information shall also be stated on physical-chemical form of ³H and ¹⁴C and iodines (organic or inorganic); the monitoring period and the monitoring methods shall be specified.

^{d)} Only if the individual alpha-emitting radionuclides are not measured.

TABLE 6: Content of standardised information for the release to the environment in the form of discharges to the watercourses of radionuclides released from nuclear reactors and from spent nuclear fuel reprocessing plants during their normal operation

Liquid discharges			
Reactor: (name/type):		Monitoring period:	
Volume of water released for that period (m ³):			
Radionuclide	Maximum value of the lowest detectable activity concentration for the relevant key radionuclide ^{a)} (Bq/m ³)	Total activity discharged (Bq) ^{b)}	Comments ^{c)}
Tritium			
³ H			
Others (activation and fission products)			
⁵¹ Cr			
⁵⁴ Mn			
⁵⁵ Fe			
⁵⁹ Fe			
⁵⁸ Co			
⁶⁰ Co			
⁶³ Ni			
⁶⁵ Zn			
⁸⁹ Sr			
⁹⁰ Sr			
⁹⁵ Zr			
⁹⁵ Nb			
¹⁰³ Ru			
¹⁰⁶ Ru			
^{110m} Ag			
¹²² Sb			
^{123m} Te			
¹²⁴ Sb			
¹²⁵ Sb			
¹³¹ I			
¹³⁴ Cs			
¹³⁷ Cs			
¹⁴⁰ Ba			
¹⁴⁰ La			
¹⁴¹ Ce			
¹⁴⁴ Ce			
²³⁸ Pu			
²³⁹ Pu + ²⁴⁰ Pu			
²⁴¹ Am			
²⁴² Cm			
²⁴³ Cm			
²⁴⁴ Cm			
Total alpha activity ^{d)}			

Explanatory notes:

^{a)} Key radionuclide pursuant to Table 2 or Table 4 of this Annex.

^{b)} In the event that at least one activity measurement for a particular radionuclide will be higher than the lowest significant activity (NVA) during the year, then all other activity measurements with the result less than NVA will be conservatively estimated one half of the NVA value and the activity of that radionuclide will be reported in this overview of discharges as the sum of all values greater than NVA and the values equal to one half of NVA for all activity measurements with the result lesser than NVA. If all values of a particular radionuclide are less than NVA for a full year, then the resulting activity of that radionuclide will be reported as zero (it will be marked with the symbol "<DL" in Table; DL = detection limit).

^{c)} The comments are stated for cases where sthe balances are predetermined by calculation, for cases where the agreed substitute values are used in balancing instead of the values less than the lowest detectable activity (NDA); the information shall also be stated on physical-chemical form of ³H and ¹⁴C and iodines (organic or inorganic); the monitoring period and the monitoring methods shall be specified.

^{d)} Only if the individual alpha-emitting radionuclides are not measured.

Annex 7 to Decree No. 360/2016 Coll.

Range of comparative measurements organised by the Office

Name of comparative measurement	Monitored item	Method of measurement	Repetition interval (first year)
Comparative measurement – TLD	Air	Thermoluminescent measurement	3 years (2018)
Comparative measurement – rapid gamma determination	Water	Gamma spectrometry	1 year (2017)
Comparative measurement – Sr and Pu in aerosols	Aerosols	Radiochemistry, alpha spectrometry	4 years (2017)
Comparative measurement – ⁹⁰ Sr in milk	Milk	Radiochemistry, beta spectrometry, summary beta	4 years (2018)
Comparative measurement – radionuclides in soil and ground cover	Soil	Gamma spectrometry	4 years (2018)
Comparative measurement – ⁹⁰ Sr in water	Water	Radiochemistry, beta spectrometry, summary beta	3 years (2019)
Comparative measurement – ³ H in water	Water	Liquid scintillation spectrometry	3 years (2019)
Comparative measurement – rapid beta determination	Water	Proportional detector of beta radiation	4 years (2019)
Comparative measurement – measurement laboratory capacity	Selected monitored items representing the environment and food chain	Gamma spectrometry	3 years (2017)