

**HEAD OF THE STATE NUCLEAR POWER SAFETY
INSPECTORATE**

**ORDER
APPROVING NUCLEAR SAFETY REQUIREMENTS BSR-1.8.6-2019 "MAINTENANCE,
SURVEILLANCE AND INSPECTION OF STRUCTURES, SYSTEMS AND
COMPONENTS IMPORTANT TO SAFETY OF A NUCLEAR FACILITY"**

3 July 2019 No. 22.3-136
Vilnius

Pursuant to Article 22(1)(3) of the Republic of Lithuania Law on Nuclear Energy and Articles 4(1), 11(1) and 42(3) of the Republic of Lithuania Law on Nuclear Safety, I hereby:

1. Approve the Nuclear Safety Requirements BSR-1.8.6-2019 "Maintenance, surveillance and inspection of structures, systems and components important to safety of a nuclear facility" (attached).
2. Establish that this Order shall enter into force on 1 November 2019.

Head

Michail Demčenko

APPROVED by
Order No. 22.3-133 of the Head of the State
Nuclear Power Safety Inspectorate of 3 July
2019

NUCLEAR SAFETY REQUIREMENTS
BSR-1.8.6-2019
"MAINTENANCE, SURVEILLANCE AND INSPECTION OF STRUCTURES, SYSTEMS
AND COMPONENTS IMPORTANT TO SAFETY OF A NUCLEAR FACILITY"

CHAPTER I
GENERAL PROVISIONS

1. The Nuclear Safety Requirements BSR-1.8.6-2019 "Maintenance, surveillance and inspection of structures, systems and components important to safety of a nuclear facility" (hereinafter referred to as the "Requirements") shall set out the general requirements for the Maintenance, surveillance and inspection of the structures, systems and components of a nuclear facility that are classified as important to safety in accordance with Article 32(8) of the legal act referred to in subparagraph 4.2 of the Requirements. Specific requirements for the maintenance, surveillance and inspection of structures, systems and components important to safety of a nuclear facility may be laid down in nuclear safety requirements and regulations.

2. The Requirements shall apply to persons holding the licences referred to in Article 22(1)(2) to (5) of the legal act referred to in subparagraph 4.2 of the Requirements (hereinafter referred to as "licence holders") and to suppliers of products important to safety to such licence holders.

3. The Requirements shall not apply to structures, systems and components important to safety of the power units of a nuclear power plant with RBMK-1500 reactors that have been permanently shut down, until the decommissioning licence for these power units is issued.

CHAPTER II
REFERENCES

4. The Requirements contain references to the following legislation:

4.1. Republic of Lithuania Law on the Conformity Assessment;

4.2. Republic of Lithuania Law on Nuclear Safety;

4.3. Republic of Lithuania Law on Nuclear Energy;

4.4. Rules for the issuance of licences and permits for activities in the field of nuclear energy, approved by Resolution No. 722 of the Government of the Republic of Lithuania of 20 June 2012 approving the Rules for the issuance of licences and permits for activities in the field of nuclear energy;

4.5. Nuclear Safety Requirements BSR-1.4.1-2016 "Management System", approved by Order No. 22.3-56 of the Head of the State Nuclear Power Safety Inspectorate of 21 June 2010 approving the Nuclear Safety Requirements BSR-1.4.1-2016 "Management System";

4.6. Nuclear Safety Requirements BSR-1.4.3-2017 "Human resources of organisations carrying out licensed activities in the sphere of nuclear power", approved by Order No. 22.3-160 of the Head of the State Nuclear Power Safety Inspectorate of 20 September 2017 approving the Nuclear Safety Requirements BSR-1.4.3-2017 "Human resources of organisations carrying out licensed activities in the sphere of nuclear power";

4.7. Nuclear Safety Requirements BSR-1.8.4-2018 "Ageing management of structures, systems and components important to safety of a nuclear facility" approved by Order No. 22.3-169 of the Head of the State Nuclear Power Safety Inspectorate of 25 July 2018 approving the Nuclear Safety

Requirements BSR-1.8.4-2018 "Ageing management of structures, systems and components important to safety of a nuclear facility";

4.8. Nuclear Safety Requirements BSR-1.1.6-2020 "Annual report on nuclear safety, radiation protection and physical security assurance", approved by Order No. 22.3-94 of the Head of the State Nuclear Power Safety Inspectorate of 18 May 2020 approving the Nuclear Safety Requirements BSR-1.1.6-2020 "Annual report on nuclear safety, radiation protection and physical security assurance".

CHAPTER III DEFINITIONS

5. 10. For the purposes of the Requirements:

5.1. **In-service inspection of structures, systems and components important to safety of a nuclear facility** shall mean an inspection of the properties of structures, systems and components important to safety of a nuclear facility, carried out throughout the lifetime of those structures, systems and components, in order to identify deterioration of the structures, systems and components due to ageing, or to identify factors that may lead to failure of those structures, systems and components.

5.2. **Surveillance of structures, systems and components important to safety of a nuclear facility** shall mean the execution of planned organisational and technical measures to maintain and improve the availability of structures, systems and components important to safety of a nuclear facility, to confirm their performance and condition in accordance with the requirements set out in the design of the facility and in the normative technical documents on nuclear safety.

5.3. **Maintenance of structures, systems and components important to safety of a nuclear facility** shall mean the implementation of planned organisational and technical measures, including preventive, corrective and repair measures, to ensure the reliable operation of structures, systems and components important to safety of a nuclear facility under the conditions specified in the design of the nuclear facility.

5.4. Other terms used in the Requirements correspond to those defined in the legal acts referred to in subparagraphs 4.1 to 4.6 of the Requirements.

CHAPTER IV IS SSC MAINTENANCE, SURVEILLANCE AND INSPECTIONS OBJECTIVES AND TASKS

6. The services and works for the maintenance, surveillance and inspection process(es) of structures, systems or components important to safety (hereinafter referred to as "IS SSC") of a nuclear facility (hereinafter referred to as "NF") shall be carried out in accordance with the design of NF, the requirements and/or recommendations of the manufacturers of the IS SSC, the requirements of the legal acts regulating nuclear safety, radiation protection and physical security and the normative technical documents for nuclear safety, and the documents of the management system prepared by the license holder, setting out the requirements for maintenance, surveillance and inspection of the IS SSC to ensure the functionality of the IS SSC, thereby ensuring nuclear safety of the NF, radiation protection and physical security of a NF, nuclear facility site, nuclear and nuclear fuel cycle materials (hereinafter referred to as "physical security").

7. During maintenance, surveillance and inspection of the IS SSC of NF, the limits and conditions of the NF operating parameters shall be met.

8. IS SSC maintenance, surveillance and inspection tasks shall be to:

8.1. ensure that the IS SSC are operated in accordance with the requirements of the design of NF and the nuclear safety normative technical documents and are capable of performing the functions specified in the design of NF;

8.2. spot and correctly assess deficiencies (for example, wear and tear, defects, deterioration, sedimentation, delamination) in the IS SSC before failures and damage to the IS SSC occur;

- 8.3. eliminate deficiencies in the IS SSC before the IS SSC fail, or replace worn out, defective IS SSC with new ones;
- 8.4. preserve (preventing premature wear and tear) IS SSC through preventive measures.

CHAPTER V ORGANISATION AND MANAGEMENT OF IS SSC MAINTENANCE, SURVEILLANCE AND INSPECTION

9. The license holder shall provide the material and human resources to carry out the maintenance, surveillance and inspection of the IS SSC and shall establish the process(es) for the maintenance, surveillance and inspection of the IS SSC of NF and prepare the documents necessary for the implementation of the management system for the maintenance, surveillance and inspection of the IS SSC.

10. The license holder shall, in accordance with the provisions of the legal acts referred to in subparagraphs 4.4 and 4.5 of these Requirements, set out in the management system documents the qualification and competence requirements for the staff who carry out the maintenance, surveillance and inspection of the IS SSC and shall ensure that they are met.

11. The license holder's management system documents shall include all administrative and technical measures for the maintenance, surveillance and inspection of the IS SSC to detect and mitigate degradation of the IS SSC functionality, repair defective IS SSC, thereby ensuring that they fulfil their functions as specified in the design of NF.

12. The organisation and management by the license holder of the services and activities of the maintenance, surveillance and inspection process(es) of the IS SSC shall be documented in the management system and shall include:

12.1. the designation of specific powers, duties and responsibilities of the license holder's departments, their staff and other persons involved in the maintenance, surveillance and inspection of the IS SSC;

12.2. the planning, allocation and assurance of the adequacy of the human and material resources necessary for the maintenance, surveillance and inspection of the IS SSC;

12.3. the preparation, review, approval and updating of clear and accurate management system documents for staff describing the performance of maintenance, surveillance and inspection of the IS SSC;

12.4. the setting of the requirements for maintenance, surveillance and inspection (for example, type, priority, sequencing of works) and the duration of their execution;

12.5. a procedure for assessing the results of maintenance, surveillance and inspection work on the IS SSC for compliance with the acceptance criteria to be established in accordance with the design of NF, the requirements, recommendations and nuclear safety normative technical documents provided by the IS SSC manufacturers;

12.6. the organisation, planning, execution and supervision of the frequency, scope and composition of maintenance, surveillance and inspection activities of the IS SSC, and the effectiveness of the performance of these activities, including an assessment of the adverse effects on the nuclear safety and radiation protection and physical security of the NF that may arise during the performance of the activities;

12.7. the recording, management and keeping of records of failures, deficiencies and/or damages detected during maintenance, surveillance and inspections of IS SSC;

12.8. the establishment and monitoring of requirements for the acquisition, storage and use of welding consumables, spare parts and tools;

12.9. the setting and enforcement of requirements to control the use of flammable and explosive materials (for example, solvents, lubricants, gases) to prevent explosions and fires;

12.10. the establishment of requirements for the inspection, calibration and testing of equipment used for maintenance, surveillance and inspection of the IS SSC;

12.11. the transmission to the organisation operating the NF of the initial information, data

collected during the manufacture, installation and commissioning of the IS SSC and its retention during all phases of the NF lifetime;

12.12. the preparation, recording and storage of documents for maintenance, surveillance and inspections of IS SSC;

12.13. the preparation of maintenance, surveillance and inspection methodologies, methods not included in the design of NF, and the assessment and approval of their suitability for use in the NF;

12.14. the application of the results of the IS SSC ageing management obtained in accordance with the legal act referred to in subparagraph 4.6 of the Requirements to the improvement of the process(es) of maintenance, surveillance and inspection of the IS SSC;

12.15. the establishment and assurance of cooperation between the licence holder and the supplier of the product(s) important to safety for the maintenance, surveillance and inspection process(es) (hereinafter referred to as the "supplier");

12.16. the application of international best practice and operational experience, to protect against extraordinary events and continuously improve safety.

13. The license holder shall ensure that the requirements set out in the management system documents for the maintenance, surveillance and inspection process(es) of the IS SSC are met in order to achieve the tasks set out in paragraph 8 of the Requirements.

14. The license holder, when carrying out maintenance, surveillance and inspection of the IS SSC and/or contracting providers of maintenance, surveillance and inspection services and/or works for the IS SSC, shall ensure that these activities are carried out by accredited bodies, in accordance with the legal act referred to in subparagraph 4.1 of the Requirements, if so provided for in the legal acts and the normative technical documents for nuclear safety governing the maintenance, surveillance and inspection of IS SSC.

15. The license holder's management system documents describing the maintenance, surveillance and inspection of IS SSC shall be prepared and approved in accordance with the procedure set out in the legal act referred to in subparagraph 4.5 of these Requirements.

16. The license holder shall approve the documents of the maintenance, surveillance and inspection management system for the IS SSC (for example, maintenance, surveillance and inspection process(es), instructions, etc.) before the start of maintenance, surveillance and inspection of the IS SSC. These management system documents shall be reviewed and updated in the light of changes in international good practice, operational experience, changes in the nuclear safety normative technical documents and changes in the actual circumstances of the activities.

17. The period of time planned by the license holder for the maintenance, surveillance and inspection of the IS SSC during which the IS SSC are prevented from performing their functions shall be reduced to the shortest possible period of time for the performance of these activities and shall be in accordance with the requirements of the design of NF and of the normative technical documents.

18. The license holder shall ensure that suppliers and the license holder's staff involved in the maintenance, surveillance and inspection of the IS SSC, in the event of the discovery of initial or recurrent malfunctions or other deficiencies, shall provide for safety improvement measures to prevent the recurrence of similar malfunctions or other deficiencies.

19. The license holder shall develop and implement corrective and safety improvement measures to ensure the quality of the services and/or work of the maintenance, surveillance and inspection process(es) of the IS SSC during maintenance of the IS SSC, in accordance with the procedure set out in the management system documents, where the efficiency of products of maintenance, surveillance and inspection process(es) does not ensure that the IS SSC operate without failures, defects and/or damage (pipeline cracking, deformation, etc.), or to improve the reliability of the IS SSC (for example, to reduce the number of failures and/or damage to the IS SSC).

CHAPTER VI

REQUIREMENTS FOR CARRYING OUT ON MAINTENANCE, SURVEILLANCE AND INSPECTION OF IS SSC

20. Maintenance, surveillance and inspection of the IS SSC by the license holder shall include the following:

20.1. documenting the execution of the works (for example, sequence of works, quantities of measured, controlled outputs, deficiencies, non-compliances and their progress, persons carrying out and supervising the works);

20.2. maintenance, surveillance and inspection of the IS SSC shall be planned and carried out in such a way as to avoid failures and/or damage to the IS SSC during their operation;

20.3. ensuring that foreign objects (e.g. tools, spare parts) are not allowed to enter the IS SSC during maintenance, surveillance and inspection of the IS SSC;

20.4. ensuring cleanliness and order in the IS SSC maintenance, surveillance and inspection work areas;

20.5. replacement of IS SSC at the end of their design lifetime if their continued use is not justified;

20.6. restoring the capability of the IS SSC to perform the functions defined for them in the design of NF following their failure and/or damage;

20.7. identifying and correcting deficiencies, limit values and conditions of performance parameters and other non-compliances of the IS SSC, and, if found, taking preventive and corrective measures to address them;

20.8. applying the principle of optimising radiation protection (ALARA) and selecting the optimal measures to reduce staff members' exposure to radiation;

20.9. ensuring the limits and conditions for the operation of the IS SSC;

20.10. providing detailed information (detailed and understandable information on how the work is to be carried out) for the staff carrying out maintenance, surveillance and inspection works on the IS SSC;

20.11. compliance with the requirements set out in the design of NF, in the requirements provided by the manufacturers of the IS SSC, in nuclear safety, radiation protection and physical security legal acts and in nuclear safety normative technical documents during maintenance, surveillance and inspections, and taking into account potential safety implications, operating limits and conditions, so as to avoid loss of performance of the IS SSC;

20.12. during the maintenance, surveillance and/or inspection of IS SSC, if any failures, deficiencies and/or irregularities in the IS SSC have been identified, all the IS SSC related to the identified failures, deficiencies and/or irregularities have been inspected, as well as all the IS SSC subject to similar technical parameters and operating conditions, which may be subject to a recurrence of such failure, deficiency and/or irregularity.

21. Following the maintenance, surveillance and inspection of the IS SSC, when restoring the IS SSC to normal operation, the license holder shall ensure that:

21.1. tests are carried out on systems and components important to safety to ensure that the limits and conditions for normal operation are met;

21.2. the configuration of the IS SSC and the SSC to ensure compliance with the limits and conditions of the IS SSC operating parameters, to prevent or mitigate nuclear and radiological accidents, and to protect people and the environment from the harmful effects of ionising radiation is verified and documented;

21.3. records of maintenance, surveillance and inspection of the IS SSC, including record forms, drawings, computer databases approved by the license holder (e.g. procedure sheets, reports of work carried out, results of work carried out and analysis of results, failures, deficiencies and/or irregularities identified, corrective measures implemented, test, calibration and inspection reports, evaluation protocols) will be analysed to assess whether the results of the work are in accordance with the requirements set out in the design of NF, the requirements provided by the manufacturers of the IS SSC, nuclear safety, radiation protection and physical security legal acts, the nuclear safety normative technical documents and the management system documents prepared by the license holder;

21.4. it is verified that all temporary modifications carried out as part of the maintenance, surveillance and inspection work have been completed and that all IS SSC are ready for safe operation;

21.5. systems and components important to safety that have undergone repairs, modifications or replacements are re-inspected, using the same inspection method that identified the failure or deterioration of those systems and components important to safety, before they are put into service;

21.6. after the repair or modification of the IS SSC, a certificate of completion of the work is drawn up, which contains details of the repair or modification carried out, identifying the defective IS SSC, describing the nature of the defect, the repair action applied and the duration of the repair. If a failure of the IS SSC is detected, a root cause analysis of the failure shall be carried out to ensure that such a failure does not recur.

22. The results of obtained during maintenance, surveillance and inspection of the IS SSC shall be documented and retained throughout the lifetime of the NF, so that they can be compared with the results of subsequent maintenance, surveillance and inspection of the IS SSC.

22¹. In addition to the Requirements, the license holder shall comply with the Nuclear Safety Rules approved by the Head of the VATESI governing the maintenance, surveillance and inspection of the radioactive waste incineration facility.

CHAPTER VII ANALYSIS OF RESULTS OF IS SSC MAINTENANCE, SURVEILLANCE AND INSPECTION

23. The license holder shall analyse and document the results of the maintenance, surveillance and inspection of the IS SSC and, taking into account the baseline information on the IS SSC and the data provided in the design of NF and obtained at the time of the commissioning NF, shall make a decision on the suitability of the IS SSC for the performance of the functions specified for them in the design of NF.

24. The license holder shall, by analysing the information on failures, deficiencies and/or irregularities of the IS SSC, identify the root causes of the failures, deficiencies and/or irregularities, identify and address the deficiencies in the maintenance, surveillance and inspection, identify trends in the failures, deficiencies and/or irregularities, and develop corrective measures to prevent recurrence of failures, deficiencies and/or irregularities. The license holder shall ensure that any assessment and remedial action to assess failures, deficiencies and/or irregularities is carried out after having satisfied itself that they will not adversely affect nuclear safety, radiation protection and/or physical security.

25. The license holder's management system documents shall stipulate that the results of maintenance, surveillance and inspection activities are to be assessed by a competent and independent person appointed by the license holder (with professional knowledge and/or experience in the field to be assessed, and not involved in the activities). The license holder's management system documents shall describe the organisation of performance assessment. The assessment shall determine whether the work has been carried out in accordance with the requirements and confirm that the quality and results of the maintenance, surveillance and inspection meet the acceptance criteria set out in the license holder's management system documents. If the assessment reveals that the results do not meet these acceptability criteria, corrective measures shall be envisaged and implemented by the license holder within the deadlines set by the license holder.

26. The license holder's staff who will assess the results of non-destructive tests carried out by the suppliers and their reporting documents shall have the necessary competence and be designated to carry out this work.

CHAPTER VIII REQUIREMENTS FOR IS SSC MAINTENANCE, SURVEILLANCE AND INSPECTION PLANS AND SCHEDULES, RECORDS AND REPORTING DOCUMENTS

27. The license holder shall plan and approve the maintenance, surveillance and inspection schedules of the IS SSC on an annual basis.

28. In accordance with the legal act referred to in subparagraph 4.8 of the Requirements, the license holder shall provide the following information in the annual report on the current year's planning of maintenance, surveillance and inspection of the IS SSC and the performance of the previous year's work:

28.1. whether there are arrangements in place to carry out maintenance, surveillance and inspection of the IS SSC during the year (e.g. whether the license holder has committed resources to carry out the work, whether the license holder's staff or service/works providers will carry out maintenance, surveillance and inspection of the IS SSC);

28.2. the progress and completion (e.g. completed or not) of the preparation of the maintenance, surveillance and inspection plans/schedules for the IS SSC for the current year;

28.3. the maintenance, surveillance and inspection work carried out on systems important to safety in the previous calendar year that was not included in the plans/schedules for the previous calendar year, and the conclusions on the completion of this work;

28.4. the maintenance, surveillance and inspection work not carried out in the previous calendar year on the IS SSC that was foreseen in the previous year's IS SSC maintenance, surveillance and inspection plans and the reasons for non-completion;

28.5. improving the maintenance, surveillance and inspection performance of the IS SSC.

29. All records and reports of maintenance, surveillance and inspection of the IS SSC shall be kept and archived in accordance with the legal act referred to in subparagraph 4.5 of these Requirements.

CHAPTER IX FINAL PROVISIONS

30. The licence holder shall be responsible for the quality and performance of the services and/or work of the maintenance, surveillance and inspection process(es), irrespective of who performs them.

31. A person who violates the Requirements shall be liable in accordance with the procedure established by the Republic of Lithuania Law on Nuclear Safety and/or the Republic of Lithuania Code of Administrative Offences.