Republic of Lithuania

National Action Plan (NAcP) responding to the Lithuania-specific and other findings of TPR II on Fire Protection at nuclear installations

TOPICAL PEER REVIEW OF FIRE PROTECTION

UNDER NUCLEAR SAFETY DIRECTIVE 2014/87/EURATOM

Vilnius 2026

1. Introduction

Under the Nuclear Safety Directive, a topical peer review (TPR) is an EU-wide review conducted by experts from Member States on a selected nuclear safety topic. Its purpose is to share experience, identify best practices and common challenges, and recommend follow-up actions to address any weaknesses. The second Topical Peer Review (TPR II, 2021-2025), led by ENSREG with WENRA's technical support, focused on fire protection.

TPR II Review Process

The review followed a structured approach:

- **National Assessment Reports** – Based on licensees' self-assessments.
- **Desktop peer review and site visits** – Conducted by experts, including inspections of selected research reactors.
- **Stakeholder engagement** – Questions and comments phase.
- **Two workshops** –To discuss thematic findings, responses, and country reviews.

State Nuclear Power Safety Inspectorate (VATESI) prepared, based on licensees' (state enterprise Ignalina NPP) self-assessment report, the Lithuanian National Assessment Report, which was published in October 2023. The National Assessment Report concluded that fire safety is ensured properly and no weaknesses were identified during the fire safety self-assessment.

In 2023-2024 the Lithuanian National Assessment Report was peer-reviewed by experts from European countries and Country Review Report (CRR) about Lithuanian nuclear facilities was prepared.

After the TPR II thematic workshop, VATESI organized a meeting with state enterprise Ignalina NPP in order to discuss the experience of other countries. During this meeting the areas for improvement fire safety in the nuclear facilities were identified and these areas was presented in Lithuanian national presentation during the TPR II Country Review workshop.

VATESI, based on information presented by state enterprise Ignalina NPP (SE INPP), prepared the Lithuanian national action plan to improve fire safety in nuclear facilities, which was approved by the Head of VATESI (Order No. 22.3-101 of 25th of June, 2026). The National Action Plan (NAcP) considered the specific findings areas for improvements (AFI) presented in the Lithuanian Country Review Report and also addressed the good practices (GP), areas of good performance (AGP) and areas of improvement (AFI) of other countries specified in the TPR II summary report on fire safety in nuclear facilities. VATESI also took into consideration the observation provided in the Lithuanian Country Review Report ("The TPR team noted that Lithuania during its national presentation had identified a need for improvement of regulatory requirements regarding new types of ignition sources (for instance, lithium-ion batteries), and addressed the responsibility of licensee to control of activities which are based on justified fire loads. ").

2. Follow-up of findings from the peer review – national areas for improvement

2.1 AFI (1) – **Spent fuel storage facility SNFSF-1**. A need to install additional equipment that would allow remote monitoring of the situation in SNFSF-1 from INPP main control room.

2.1.1 Identified action(s) and implementation progress

The recommendations of the TPR team concerning the specific findings identified in the Lithuanian CRR were included in the SE INPP Safety Improvement Programme for 2025-2026. The action identified to address AFI (1) is the modification of the existing video surveillance system of the open container storage area of SNFSF-1 (building 192), which will allow to monitor remotely the situation in the storage area from the Ignalina NPP main control room. The action is underway and planned to be completed by 31 December 2026.

2.1.2 Applicability to represented installations

The finding is attributed to the spent nuclear fuel storage facility SNFSF-1. The represented installation of the same type is the spent nuclear fuel storage facility SNFSF-2. The situation in the SNFSF-2 storage area is monitored from the SNFSF-2 control room, thus no additional action is necessary for this installation.

2.2 AFI (2) – **On-site radioactive waste storage facilities**/ A needs to implement solutions to improve the reliability of fire detectors that are operating in hard conditions (for instance, high radiation, humidity) in Solid waste treatment and storage facilities (B3/4 project) and Solid waste storage buildings 157, 157/1.

2.2.1 Identified action(s) and implementation progress

The recommendations of the TPR team concerning the specific findings identified in Lithuanian CRR were included in the SE INPP Safety Improvement Programme for 2025-2026. The action identified to address AFI (2) is the improvement of the reliability of the fire detection and alarm system equipment in the Solid Radioactive Waste Treatment and Storage Complex (project B3/4) and in the Solid radioactive waste storage buildings 157 and 157/1. The action is planned and is to be completed by 31 December 2026. In addition, the technical condition of the existing fire detectors will be assessed, and relevant detectors will be modernized or replaced, giving priority to the systems and areas where the detectors operate in harsh conditions (to be completed by 31 December 2027).

2.2.2 Applicability to represented installations

The finding is attributed to the radioactive waste storage facilities. The represented installations are the Solid Waste Retrieval Facility (project B2-2), the Liquid Waste Storage Facility (building 151), the Bituminized Waste Storage Facility (building 158) and the Cemented Waste Storage Facility (building 158/2). The action described above covers the nuclear facilities in which fire detectors operate in harsh conditions (high radiation, humidity). In the remaining facilities the fire detectors do not operate in such conditions and no additional action is necessary.

2.3 AFI (3) – **All facilities**/ A needs for standardization of inspections and functionality testing procedures for fire dampers. Fire dampers must be visually inspected on site for actuation condition and such a method shall be properly addressed in relevant SE INPP operating and maintenance procedures.

2.3.1 Identified action(s) and implementation progress

The recommendations of the TPR team concerning the specific findings identified in Lithuanian CRR were included in the SE INPP Safety Improvement Programme for 2025-2026. The action identified to address AFI (3) is the review of the SE INPP operation, maintenance and inspection procedures, providing for periodic functional testing of all fire dampers and, at established intervals, for on-site visual inspection of the fire dampers for their actuation condition, and the inclusion of these activities in the relevant operation, maintenance and inspection procedures. The action is underway and is to be completed by 31 December 2026.

2.3.2 Applicability to represented installations

The finding is attributed to all nuclear installations of SE INPP. The action described above covers all nuclear installations operated by SE INPP in which fire dampers are installed and therefore applies to all represented installations.

3. Follow-up of other findings resulting from the self-assessment

The self-assessment did not reveal any weaknesses in the fire protection of the nuclear installations of SE INPP. No findings were identified during the self-assessment. However, during its national presentation, Lithuania identified areas for improvement, which were discussed at the country workshop and acknowledged by the TPR Team.

4. Consideration of the other findings[1] from the peer review to enhance fire protection

4.1 Applicability of good practices identified in the peer review

Following the evaluation, it was concluded that the following good practices identified during the peer review of other countries national reports are relevant to the nuclear installations of the Republic of Lithuania and will be applied:

Annex B - Compilation of Good Practices, GP-1, "Implementing learning from experience feedback from fire events in non-nuclear settings,"

Annex B - Compilation of Good Practices, GP-3, "A dynamic system to manage storage area for transient fire loads and other non-combustible materials."

The other two good practices compiled in TPR II national action plan template Annex IV were also assessed. The Good Practice GP-2, "Extensive series of tests carried out to assess the effects of fire on elements (electrical equipment, fire doors, cables, seals, etc.) credited in the fire safety analyses to confirm their assumed resistance to the fire-induced phenomena," is not considered relevant to the nuclear installations of the Republic of Lithuania, because the INPP is permanently shut down and undergoing decommissioning and does not carry out the extensive experimental fire-testing programme for elements credited in fire safety analyses to

[1] The TPR II Summary Report mentions in section 9.2 that *"……. The Board encourages countries to examine all findings from this peer review – regardless of the categorisation (good practice, area of good performance, area for improvement) – and assess their applicability to enhance fire protection*."

which this good practice relates. Good Practice GP-4 was likewise assessed and is not considered relevant to the Lithuanian nuclear installations.

4.2 Applicability of national areas of good performance in other countries

Following the assessment, it was concluded that the following national area of good performance of other countries is relevant to the nuclear installations of the Republic of Lithuania and will be applied:

Annex C - Compilation of National Areas of Good Performance, FR-AGP-7 "Learning from experience gained from fire incidents at non-nuclear energy facilities."

4.3 Applicability of national areas of improvement in other countries

From "Structure and contents of the National Action Plans (NAcP) responding to the country-specific and other findings of TPR II on Fire Protection at nuclear installations:

Annex D - Compilation of National Areas for Improvement, HU-AFI-3 "Lack of detectors for an area with combustible materials temporary storage,"

Annex D - Compilation of National Areas for Improvement, DK-AFI-1 "Since there are no dampers installed in ventilation system, the fire in the building can spread through the duct system,"

Annex D - Compilation of National Areas for Improvement, DK-AFI-4 "There is a need to implement a system to document the inventory of fire loads (e.g. computer system),"

Annex D - Compilation of National Areas for Improvement, BG-AFI-1 "The need for replacement of fire detectors due to ageing management,"

Annex D - Compilation of National Areas for Improvement, UK-AFI-2 "No explicit fire loading limits: a proportionate approach is needed to implement the day-to-day management of fire loading with the assessment of fire loading in the nuclear safety case."

5. Overall conclusions

The 2nd Topical Peer Review Summary Report. "Fire Protection." The TPR II peer review acknowledged that the increasing deployment of new energy storage systems, particularly lithium-ion batteries, highlights the necessity for tailored fire prevention and protection strategies.

To address these evolving risks, the following needs were identified:

- Development of specific guidelines for the safe use, storage, and disposal of lithium-ion batteries in nuclear installations;
- Verification and enhancement of the effectiveness of fire protection provisions.

Lithuanian National Actions: Lithuania is going to improve its regulatory framework to address new types of ignition sources and to formalize licensee obligations regarding the control of activities based on justified fire loads. Full implementation of the measures outlined in the National Fire Protection Action Plan will improve fire safety and prevention across all existing nuclear facilities in Lithuania.

Annex A - Summary table of the actions planned/implemented

Section of NAcP	**Reference no of the findings**	**Installation type/name** (as relevant)	**Thematic**	**Finding**	**Action** (specify if planned/underway/completed)	**Deadline**	**Regulatory authority's comment on progress**
2.	2nd Topical Peer Review – "Fire Protection." Country Review Report. Lithuania AFI (1)	Spent fuel storage INPP – AFI (1)	Active Fire Protection	A need to install additional equipment that would allow remote monitoring of the situation in SNFSF-1 from INPP main control room.	Modification of the existing video surveillance system of the open container storage area (SNFSF-1, building 192).	2026-12-31	In progress
2.	2nd Topical Peer Review – "Fire Protection." Country Review Report. Lithuania AFI (2)	On-site radioactive waste storage facilities INPP - AFI (2)	Active Fire Protection	A need to implement solutions to improve the reliability of fire detectors that are operating in hard conditions (for instance, high radiation, humidity) in Solid waste treatment and storage facilities (B3/4 project) and Solid waste storage buildings 157, 157/1.	Increase the reliability of fire detection and alarm system equipment in the Solid Radioactive Waste Processing and Storage Complex (project B3/4) and Solid waste storage buildings (157, 157/1).	2026-12-31	Planning
2.	2nd Topical Peer Review – "Fire Protection." Country Review Report. Lithuania AFI (3)	All NF, INPP - AFI (3)	Passive Fire Protection	A need for standardization of inspections and functionality testing procedures for fire dampers. Fire dampers must be visually inspected on site for actuation condition and such a method shall be properly addressed in relevant Ignalina NPP operating and maintenance procedures.	Review the operation, maintenance, and inspection procedures of nuclear facilities operating by the SE INPP ensuring they provide for periodic functional testing of all fire dampers and regular visual inspections at established intervals, and to integrate these activities into	2026-12-31	In progress

					the relevant operational, maintenance, and inspection documentation.		
4.	-	All NF, INPP	Active Fire Protection	Structure and contents of the National Action Plans (NAcP) responding to the country-specific and other findings of TPR II on Fire Protection at nuclear installations Annex D - Compilation of National Areas for Improvement, BG-AFI-1 "The need for replacement of fire detectors due to ageing management."	Improve the technical maintenance of fire detectors by assessing the technical condition of existing fire detection detectors and modernizing or replacing relevant detectors giving priority to systems and zones where these detectors are operated in difficult conditions.	2027-12-31	Planning
4.	-	All NF, INPP	Fire Prevention	Structure and contents of the National Action Plans (NAcP) responding to the country-specific and other findings of TPR II on Fire Protection at nuclear installations Annex B - Compilation of Good Practices, GP-3, "A dynamic system to manage storage area for transient fire loads and other non-combustible materials," Annex D - Compilation of National Areas for Improvement, DK-AFI-4 "There is a need to implement a system to document the inventory of fire loads (e.g.	Enhance temporary fire load management by implementing a system—digitized where possible—for the accounting, tracking, and control of temporary combustible materials and their storage areas, with a specific focus on dismantling works. Ensure this information is continuously accessible for operational maintenance and periodic control.	2028-12-31	Planning

				computer system),” Annex D - Compilation of National Areas for Improvement, HU-AFI-3 “Lack of detectors for an area with combustible materials temporary storage.”			
4.		All NF, INPP	Passive Fire Protection	Structure and contents of the National Action Plans (NAcP) responding to the country-specific and other findings of TPR II on Fire Protection at nuclear installations Annex C Compilation of National Areas for Improvement, DK-AFI-1 “Since there are no dampers installed in ventilation system, the fire in the building can spread through the duct system.”	Analysis of ventilation systems. Perform additional assessment of the risk of fire spread through duct systems and analysis of the installation and adequacy of fire dampers, considering the purpose of specific SE INPP nuclear facilities, the current technical condition and provide recommendations on the need for compensatory measures.	2029-12-31	Planning
4.		All NF, INPP	Fire Prevention	Structure and contents of the National Action Plans (NAcP) responding to the country-specific and other findings of TPR II on Fire Protection at nuclear installations Annex D - Compilation of National Areas for Improvement, UK-AFI-2 “No explicit fire loading limits: a proportionate approach is needed to implement the day-to-day management of fire loading with the assessment of	Improvement of the daily control mechanism of fire load limits. To prepare and implement a clear and effective daily control mechanism of permissible fire load limits in separate zones of the nuclear facilities operated by SE INPP (nuclear, radioactive materials are stored/protected, hot works are carried out, radioactive waste is managed, etc.).	2028-12-31	Planning

				fire loading in the nuclear safety case."			
4.		All NF, INPP	Fire Prevention	Structure and contents of the National Action Plans (NAcP) responding to the country-specific and other findings of TPR II on Fire Protection at nuclear installations Annex B - Compilation of Good Practices, GP-1 "Implementing learning from experience feedback from fire events in non-nuclear settings," Annex C - Compilation of National Areas of Good Performance, FR-AGP-7 "Learning from experience gained from fire incidents at non-nuclear energy facilities."	To enhance the analysis of operating experience, internal quality management documents should be supplemented with provisions for the systematic evaluation of significant and high-consequence industrial fire events in the non-nuclear energy sector. This includes analysing their applicability to the nuclear facilities operated by SE INPP and identifying potential needs to improve preventive, organizational, and technical measures.	2026-12-31	In progress
5.	2nd Topical Peer Review – "Fire Protection." Country Review Report. Lithuania	All NF, INPP	Fire Prevention	The TPR team noted that Lithuania during its national presentation identified a need for improvement of regulatory requirements regarding new types of ignition sources (for instance, lithium-ion batteries), and which address the responsibility of licensee to control of activities which are based on justified fire loads.	The TPR II peer review acknowledged that the increasing introduction of new energy storage systems such as lithium-ion batteries underscores the need for effective fire prevention and protection strategies tailored to these evolving risks. To address this challenge, a need was identified for:	2027-11-01	Planning

					Supplement the Nuclear Safety Requirements BSR-1.7.1-2014 "Fire Safety of Safety-Relevant Structures, Systems and Components of a Nuclear Facility" with provisions on ensuring the prevention of fire hazards posed by lithium-ion batteries and mechanisms for controlling temporary fire loads, as well as for ensuring the effectiveness of fire protection provisions.		