ROMANIA

National Action Plan based on the EU Topical Peer Review on Fire Protection for Nuclear Installations

August 2026

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1. INTRODUCTION

This report has been prepared by the National Commission for Nuclear Activities Control (CNCAN), the nuclear regulatory authority of Romania, to present the national action plan resulting from the European Union Topical Peer Review (TPR) on Fire Protection for Nuclear Installations.

The fire protection of the following nuclear installations has been assessed as part of the TPR:

- Cernavoda Nuclear Power Plant (NPP) Units 1 and 2, in operation, with their associated spent fuel storages and radioactive waste management facilities, including the Intermediate Dry Spent Fuel Storage Facility (IDSFS) located on the Cernavoda site for the spent fuel long term storage;
- The TRIGA Research Reactor, in operation, with its associated spent fuel storage and radioactive waste management facilities;
- The Nuclear Fuel Manufacturing Plant, with its associated radioactive waste management facilities.

All these nuclear installations and their associated activities are licensed by CNCAN.

Based on the regulatory reviews and inspections performed so far, CNCAN is satisfied with the adequacy of the licensees' fire protection programs and with their overall implementation. Nevertheless, several opportunities for improvement have been identified, both from self-assessment and from the peer review, with regard to the regulatory framework and to the licensees' fire protection programs, and are included in the action plan.

2. FOLLOW-UP OF FINDINGS FROM THE PEER REVIEW – NATIONAL AREAS FOR IMPROVEMENT

2.1 AFI (1) Nuclear installation: Cernavoda NPP Unit 1: Fire hydrants and piping not yet installed in the Reactor Building of Unit 1.

2.2.1 Identified action(s) and implementation progress

The licensee is preparing the extension of the operating lifetime of Unit 1 of Cernavoda NPP by undertaking a comprehensive refurbishment project, capable of ensuring the safe long-term operation of the plant up to an additional 30-year cycle.

The installation of internal fire hydrants and piping in the Reactor Building of Unit 1 will be implemented during the planned refurbishment. The target date for completion of this action is 31st of December 2030.

2.2.2 Applicability to represented installations

This finding is applicable only to Unit 1 of Cernavoda NPP.

2.2 AFI (2) – TRIGA Research Reactor in Pitesti: The fire hazard analysis performed in 2013 has not been revised and updated yet. It should be updated as part of Periodic Safety Review of the RR which is currently under development. According to the TPR Team, FHA should be revised at least every 10 years as part of the PSR.

2.2.1 Identified action(s) and implementation progress

The fire hazard analysis (FHA) for the TRIGA Research Reactor in Pitesti will be revised and updated, taking into account the latest regulatory requirements and applicable standards. The target date for completion of this action is 31st of January 2028.

The revised regulations on fire protection for nuclear installations require the revision of FHA at least every 5 years.

2.2.2 Applicability to represented installations

This finding is applicable only to the TRIGA Research Reactor in Pitesti.

2.3 AFI (3) – Applicable to all nuclear installations: The combination of fire and earthquake events is not systematically considered and documented in all nuclear installations, as applicable.

2.3.1 Identified action(s) and implementation progress

The current specific regulations on fire protection for nuclear power plants – NSN-09 (Regulation on the protection of nuclear power plants against internal fires and explosions) have been issued by CNCAN in 2006. In 2025 and 2026, this regulation has been revised and updated and its scope has been extended to all types of nuclear installations. The revised regulation applies to all nuclear installations and requires more systematic fire safety analyses, including the analysis and documentation of credible combinations of fire and earthquake events. The revised regulation includes provisions that address opportunities for improvements identified at international level, including those resulting from the EU TPR on Fire Protection for Nuclear Installations. The target date for completion of this action for the revision of NSN-09 is 31st of December 2026.

Following the issuance of the new regulation, CNCAN will perform regulatory reviews and inspections to verify its implementation in all the nuclear installations. The target date for the completion of the revised and updated fire safety analyses and assessments is 30th of March 2029.

2.3.2 Applicability to represented installations

The safety study of Cernavoda has considered cases of consequential fires after earthquakes and adopted mitigation measures accordingly. However, this analysis has not been performed and documented systematically.

Romania has identified in its self-assessment that CNCAN regulations include specific provisions on fire hazard analyses only for nuclear power plants. The fire protection regulations are in process of being revised (revision and update of the NSN-09 regulation) and will be applicable to all nuclear installations. Detailed inspections will be performed to ensure compliance with the new regulatory requirements.

3. FOLLOW-UP OF OTHER FINDINGS RESULTING FROM THE SELF-ASSESSMENT

The self-assessment findings are already captured as areas of improvement, so for these there is no need to repeat information already presented.

Improvements to the regulatory requirements and oversight processes have been also identied, as part of Romania's National Assessment Report for the EU Topical Peer Review on Fire Protection for Nuclear Installations (sections 3.5.A Regulator's assessment of the fire

protection concept and conclusions and 4. Overall Assessment and General Conclusions) and are included in the national action plan.

One of the actions identified is already in progress and relates to the revision of the nuclear safety regulations on fire protection. The revised NSN-09 regulation, on Fire Protection for Nuclear Installations, will be issued before the end of 2026.

At the same time, CNCAN is integrating fire protection aspects in all other relevant regulations. As an example, when CNCAN issued a new regulation NSN-19 - Nuclear safety requirements on design changes and configuration control for nuclear installations (which was published and entered into fore in November 2025), it included specific provisions and a detailed checklist with items that shall be taken into account in the development and review of design changes with potential impact on fire protection, covering all relevant aspects (fire safety analyses, materials, design and operation of systems, structures, components and equipment credited important for fire protection, fire fighting capabilities, strategies and plans).

CNCAN will also revise its internal procedures and checklists for the detailed reviews and inspections of fire protection for nuclear installations; the target date for the completion of this action is 30th of April 2027.

In addition, CNCAN will provide systematic specific technical training on fire protection for nuclear installations to the regulatory reviewers and inspectors; the target date for the completion of this action is 30th of September 2027.

4. CONSIDERATION OF THE OTHER FINDINGS FROM THE PEER REVIEW TO ENHANCE FIRE PROTECTION

The information in the ENSREG 2nd Topical Peer Review Summary Report “Fire Protection” issued in 2025, as well as the information made available during the TPR workshops was reviewed to identify improvements to the regulatory framework and the licensees’ arrangements for fire protection.

Taking into account the challenge identified with regard to the consideration of new types of fire sources, a specific requirement has been introduced in the revised NSN-09 regulation to address aspects related to the fire hazards posed by the use of lithium-ion batteries.

Based on the information obtained from the TPR, several other improvements have been made to the NSN-09 regulation, including specific provisions on ageing management for the fire protection systems and structures.

Also, Romania considers the principle underlying GP-1, concerning the systematic use of lessons learned from fire events in non-nuclear settings, relevant for all types of nuclear installations. Requirements for the use of relevant internal and external operating experience, including experience from other industrial installations, have been strengthened in the revised NSN-09 regulation. In addition, CNCAN will further formalise the systematic regulatory review of operating experience relevant to fire protection as described below.

To further strengthen the systematic use of operating experience for the continuous improvement of fire protection, CNCAN will establish and implement a periodic thematic review of relevant internal and external operating experience in the area of fire protection. The review will consider, as applicable:

- fire events and significant fire-related near misses at Romanian nuclear installations;

- events involving degradation, failure, malfunction or spurious actuation of active or passive fire protection features;
- relevant fire-related operating experience from nuclear installations in other countries;
- significant fire events and lessons learned from non-nuclear industrial facilities where the experience may be transferable to nuclear installations;
- experience associated with emerging technologies and new types of fire or ignition sources;
- relevant findings from regulatory inspections, safety review missions, peer reviews, research and development activities, and developments in applicable codes, standards and guidance.

The review will assess the applicability and safety significance of the identified experience for the different types of Romanian nuclear installations and will identify, as appropriate, potential vulnerabilities and opportunities for improvement.

Based on the results of the review, CNCAN will determine whether additional regulatory actions are necessary, including focused regulatory reviews or inspections, requests for licensee assessments, revisions of regulatory requirements or guidance, improvements to regulatory procedures and checklists, or the consideration by licensees of modifications to fire safety analyses, operating arrangements, training, maintenance programmes or fire protection measures. Relevant conclusions and lessons learned will be communicated to the licensees and incorporated, as appropriate, into CNCAN regulatory oversight activities.

The review will be performed periodically and additionally following significant events or new developments with potential relevance to fire protection at nuclear installations. The target date for initiating the process is 30th of September 2026.

5. OVERALL CONCLUSIONS

The EU TPR has provided a valuable opportunity to perform a comprehensive review of the arrangements for fire protection at Romanian nuclear installations, to compare national regulatory and licensee practices with those implemented in other participating countries and to identify opportunities for further improvement.

Based on the results of the national self-assessment, the regulatory reviews and inspections performed by CNCAN and the findings of the peer review, CNCAN considers that the overall fire protection arrangements implemented at the Romanian nuclear installations are adequate. At the same time, the review has identified several specific areas where further improvements are appropriate, consistent with the principle of continuous improvement of nuclear safety.

The National Action Plan addresses all the areas for improvement identified for Romania by the TPR Team. The planned actions include the installation of internal fire hydrants and associated piping in the Reactor Building of Cernavoda NPP Unit 1 as part of the refurbishment project, the revision and update of the fire hazard analysis for the TRIGA Research Reactor, and the systematic consideration and documentation of credible combinations of fires and earthquakes in the safety analyses for nuclear installations, as applicable.

An important element of the National Action Plan is the strengthening of the regulatory framework and regulatory oversight arrangements for fire protection. CNCAN is finalising the revision of the NSN-09 regulation, extending its scope from nuclear power plants to all types of nuclear installations and introducing more detailed requirements for fire safety analyses and assessments, ageing management of fire protection systems and structures, consideration of combinations of other hazards and emerging fire hazards. CNCAN will also revise the relevant internal regulatory review and inspection procedures and checklists and will provide specific technical training on fire protection to regulatory reviewers and inspectors.

The TPR findings and the information exchanged during the peer review have also been considered in order to identify additional opportunities for improving fire protection. In particular, the revised regulatory requirements address the fire and explosion hazards associated with lithium-ion batteries and other relevant emerging technologies. The systematic use of internal and external operating experience, including relevant experience from nuclear and non-nuclear industrial facilities, will continue to support the identification of potential vulnerabilities and reasonably practicable improvements in fire protection.

The peer review also recognised as an area of good performance the permanent professional firefighting unit established at the Cernavoda NPP site, which provides an important element of the defence-in-depth arrangements for fire protection and contributes to a timely and robust response to fire events.

CNCAN will monitor the implementation and effectiveness of the actions included in this National Action Plan through its regulatory review and inspection activities and will report on their progress in accordance with the ENSREG follow-up arrangements. Lessons learned from the implementation of these actions, relevant operating experience, developments in international standards and guidance and future technological developments will continue to be considered for the improvement of fire protection at Romanian nuclear installations.

6. REFERENCES

1. ENSREG 2nd Topical Peer Review – "Fire Protection", Country Review Report for Romania, 2025 https://nuclear-safety-regulators.ec.europa.eu/topics/topical-peer-reviews/country-specific-reports-tpr-ii/eu-member-states-tpr-ii/romania_en

2. Romanian National Assessment Report for the EU Topical Peer Review on Fire Protection for Nuclear Installations, 2023 https://nuclear-safety-regulators.ec.europa.eu/topics/topical-peer-reviews/country-specific-reports-tpr-ii/eu-member-states-tpr-ii/romania_en

3. ENSREG 2nd Topical Peer Review Summary Report "Fire Protection", 2025 https://nuclear-safety-regulators.ec.europa.eu/topics/topical-peer-reviews_en

LIST OF ACRONYMS

AFI – Area for Improvement

CNCAN – National Commission for Nuclear Activities Control

ENSREG – European Nuclear Safety Regulators Group

FHA – Fire Hazard Analysis

GP – Good Practice

NPP – Nuclear Power Plant

PSR – Periodic Safety Review

TPR – Topical Peer Review

TRIGA – Training, Research, Isotopes, General Atomics

ANNEX A - SUMMARY TABLE OF THE ACTIONS PLANNED/IMPLEMENTED

#	Section of NAcP	Ref. no of the finding	Installation type/name (as relevant)	Thematic	Finding	Action (specify if planned/underway/completed)	Deadline	Regulatory authority's comment on progress
1	2	AFI 1	NPP – Cernavoda NPP Unit 1	Fire Protection Concept and its Implementation	Fire hydrants and piping not yet installed in the Reactor Building of Unit 1.	The installation of internal fire hydrants and piping in the Reactor Building of Unit 1 will be implemented during the planned refurbishment.	31st of December 2030	This modification is under preparation.
2	2	AFI 2	RR - TRIGA Research Reactor in Pitesti	Fire Safety Analyses	The fire hazard analysis performed in 2013 has not been revised and updated yet. It should be updated as part of Periodic Safety Review of the RR which is currently under development. According to the TPR Team, FHA should be revised at least every 10 years as part of the PSR.	The fire hazard analysis (FHA) for the TRIGA Research Reactor in Pitesti will be revised and updated, taking into account the latest regulatory requirements and applicable standards. The revised regulations on fire protection for nuclear installations require the revision of FHA at least every 5 years.	31st of January 2028	The action is in progress. CNCAN issued an action for the revision of the FHA for the TRIGA Research Reactor.
3	2	AFI 3	All nuclear installations	Fire Safety Analyses	The combination of fire and earthquake events is not systematically considered and documented in all nuclear installations, as applicable.	Following the issuance of the new regulation, the licensees will revise and update the fire safety analyses and assessments to include systematic analysis of combinations of fire and earthquake events	30th of March 2029	
4	3	3.5.A, 4	All nuclear	Regulatory	The need for the revision of the regulations on fire protection for	CNCAN will issue a revised regulation on Fire Protection for	31st of December	The revised regulation

			installations	activities	nuclear installations has been identified as part of the self-assessment.	Nuclear Installations, applicable to all types of nuclear installations, including provisions for the systematic analysis of combinations of fire and earthquake events	2026	was issued for public consultation in 2025 and in 2026 it is being prepared for publication.
5	3	3.5.A, 4	All nuclear installations	Regulatory activities	The need for the revision of the regulatory oversight procedures on fire protection for nuclear installations has been identified as part of the self-assessment.	CNCAN will revise its internal procedures and checklists for the detailed reviews and inspections of fire protection for nuclear installations	30th of April 2027	
6	3	3.5.A, 4	All nuclear installations	Regulatory activities	The need for the provision of systematic specific technical training on fire protection for nuclear installations, for the regulatory reviewers and inspectors, has been identified as part of the self-assessment.	CNCAN will provide systematic specific technical training on fire protection for nuclear installations to the regulatory reviewers and inspectors	30th of September 2027	
7	4	GP-1	All nuclear installations	Regulatory activities	GP-1: Implementing learning from experience feedback from fire events in non-nuclear settings.	CNCAN will periodically review relevant internal and external operating experience on fire protection, including relevant experience from non-nuclear industries, to identify potential vulnerabilities and opportunities for improvement.	30th of September 2026 (for initiating the process)	Continuous activity