ENSREG 2nd Topical Peer Review

National Action Plan of Hungary

On Fire Protection

Hungarian Atomic Energy Authority

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1. Introduction

1.1 Background

In line with Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations and according to the scope of the self-assessment defined by European Nuclear Safety Regulators Group (ENSREG) the Hungarian nuclear facilities and co-authorities responsible for nuclear and fire safety carried out a comprehensive self-assessment in the field of fire safety/protection under Topical Peer Review II (TPR II), the results of which were presented in the form of a National Assessment Report (NAR). This combined effort was coordinated by the Hungarian Atomic Energy Authority (HAEA). The specifics of the self-assessment as well as the structure and expected content of the various chapters within the National Assessment Report were defined by thy ENSREG in a dedicated Technical Specification document by the Western European Nuclear Regulators' Association (WENRA).

Based on the Technical Specification, the HAEA included the following facilities into the self-assessment:

- Paks Nuclear Power Plant (PAE)
- Budapest University of Technology and Economics –Training Reactor (BME OR)
- Budapest Research Reactor (BKR)
- Interim Spent Fuel Storage Facility (KKÁT)

As a result of the self-assessment the NAR [1] was compiled. During the self-assessment, the domestic experts established that the Hungarian legal and regulatory framework is in line with the WENRA Safety Reference Levels (SRLs), the gap analysis found only a few minor exceptions, for which the HAEA formulated amendments for the Nuclear Safey Codes. For the licensees invited to the self-assessment, the co-authorities considered it necessary to formulate a total of 16 corrective actions, the implementation of which the licensees voluntarily undertook.

The ENSREG experts provided the list of their findings in the form of a Country Review Report (CRR) [2]. Overall, 6 findings were identified as areas for improvement (AFI), which are to be addressed by the current National Action Plan (NAcP) in addition to the 16 actions identified during the self-assessment process.

The NAcP was formulated in line with the template and expectations established in [3]. The HAEA invited all nuclear facilities involved in the development of the NAR to update the status of corrective actions set in the NAR as well as to propose, and if possible, implement the corrective actions necessary to address the areas of improvement identified by the CRR.

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

Section 2 of the NAcP is dedicated to the country-specific findings resulting from the peer review as reported in section 4 of Hungary's CRR.

2.1 AFI (1) – Budapest Research Reactor and Training Reactor

The site conditions create conflicting responsibilities between the site owner and reactor operator organisation, which complicates the approval processes for certain modifications or corrective actions.

2.1.1 Identified action(s) and implementation progress

Identified corrective action(s):

Investigate solutions to clarify and separate responsibilities of the different actors of the site (e.g.: through bi-lateral/multi-lateral agreements or procedures and requirements)

Implementation status:

- BKR: The restructuring of the HUN-REN research network was completed in October 2025, in accordance with the HUN-REN Act. The Act stipulates that the properties purchased from the Hungarian Academy of Sciences will be transferred to HUN-REN. This resolves the legal status of the site and consolidates its operation under a single entity. However, the agreement between the Academy and the State was challenged in court, so it could not be implemented until the lawsuit was resolved.

This corrective action is expected to be resolved by the **end of 2026.**

- BME OR: The BME Training Reactor is operated by the staff of the BME Institute of Nuclear Techniques. The building of the Training Reactor, however, is maintained by the corresponding department of the university. Also, the fire protection activities are managed centrally by the university, with responsibility at a central organization. The operating organization has already contacted the other departments and organization to investigate ways to clarify the roles in respect of fire protection. It is planned to come to an agreement in this regard between the interested parties, the contents of which will be communicated to HAEA.

The corrective action is expected to be implemented by **end of 2026.**

2.1.2 Applicability to represented installations

No other represented installations were identified.

2.2 AFI (2) –Training Reactor

No inventory of the flammable materials transported into the facility (e.g. packaging materials, paints).

2.2.1 Identified action(s) and implementation progress

Identified corrective action(s):

Develop procedures and forms to log information on flammable materials transported into the facility.

Implementation status:

Procedures on the transportation of larger amounts of flammable material in/out of the Training Reactor are currently under development in line with the identified corrective action aimed to record if significant amount of flammable material is transported into the facility and making sure that unnecessary flammable material cannot accumulate within the facility.

The procedures are planned to be completed and issued by the **end of 2026**.

2.2.2 Applicability to represented installations

No other represented installations were identified.

2.3 AFI (3) – PAKS NPP

Lack of detector for an area with combustible materials temporary storage.

2.3.1 Identified action(s) and implementation progress

Identified corrective action(s):

Install flame detectors in the transverse corridor A008/4-4 and A008/2-2.

Implementation status:

The installed automatic foam system consists of a water supply source, a booster pump, a bladder tank, a foam proportioner, discharge nozzles, and the associated galvanized steel piping network. In this section of corridor A008/2-2 and A008/4-4, 3 smoke detectors and 1 flame detector are currently installed. For safe activation of the extinguishing system, simultaneous signalling from 2 detectors is required. To achieve optimal area coverage, the installation of 1 additional smoke detector and 1 additional flame detector is justified. To resolve this, an automatic foam fire-extinguishing system will be installed for the protection of the oil handling tank located in the corridors.

The completion of the corrective action is projected by **end of 2026**.

2.3.2 Applicability to represented installations

No other represented installations were identified.

2.4 AFI (4) – PAKS NPP

Fire detection systems for buildings other than the reactor and turbine buildings and water extraction plant are not seismically qualified and not independent between adjacent compartments. A risk-based justification is not provided.

2.4.1 Identified action(s) and implementation progress

Identified corrective action(s):

Re-evaluate the current Fire Safety Assessment (FSA), from the point seismic qualification needs for fire detection equipment.

Implementation status:

The Licensee reviewed the relevant regulatory and documentation requirements and analysis results. It was concluded that the Nuclear Safety Codes clearly specify the seismic classification of systems and system components. The requirements for seismic safety classification are defined in the Nuclear Safety Codes. 3.3.6.0120., 3.3.6.0130., 3.3.6.0140. and 3.3.6.0150. requirements, establishing seismic categories from FBOS1 (seismic safety class 1) to FBOS4 (seismic safety class 4), where FBOS1 is the highest, strictest seismic safety class category. FBOS4, the fourth category, includes system components that do not belong to any of the three seismic safety classes and are considered irrelevant from a seismic safety point of view. According to the regulations, all ABOS3 (safety class 3) and ABOS4 (safety class 4) system components that could endanger an FBOS1–2 classified component in the event of their failure shall be classified as FBOS3. These typically include:

- system components located in a primary circuit room together with an FBOS1–2 classified component and posing a hazard to it,
- system components located within 5 meters in the turbine hall or in outdoor areas from an FBOS1–2 classified component, or positioned above it (within a 5-meter radius at any height),
- system components whose failure could result in flooding of an FBOS1–2 classified component not designed for flooding, potentially impairing its safety function.

Based on the above, fire detection systems located outside the technological area do not fall into the FBOS3 category; therefore, their classification is FBOS4 (non-seismic safety class).

During the review the conclusions drawn from the risk assessment examining the subject as a whole, were also taken into consideration and it was concluded that extending the seismic safety classification to non-technological areas, is not justified. The fire events induced by earthquakes were assessed in the research report titled “Risk Assessment of Internal Hazards Induced by Earthquakes, Phase II – Seismically Induced Internal Fires,” was prepared by the MVM Paks NPP Ltd. and NUBIKI LLC. The methodological framework established was based on the document “Methodology for Seismically Induced Internal Fire and Flood Probabilistic Risk Assessment” (Technical Report 3002012980, June 2018) published by the Electric Power Research Institute. The results of the analysis indicate that the expected frequency of core damage attributable to fire events is influenced only by fires occurring in rooms within the technological buildings, but other fire events on site do not have such an impact. Accordingly, it is not technically justified to design fire detection systems located in buildings not seismically qualified for seismic loads, since the enclosing structure itself is not demonstrably capable of withstanding the design-basis earthquake. The re-evaluation was documented by the licensee and was also submitted to the HAEA.

The corrective action is considered **completed.**

2.4.2 Applicability to represented installations

No other represented installations were identified.

2.5 AFI (5) – PAKS NPP

There is a need to reassess the detection strategy in area/rooms with harsh environment, in particular high radiation, according to FSA, and consider the adoption of appropriate fire detection solutions where needed.

2.5.1 Identified action(s) and implementation progress

Identified corrective action(s):

Re-assess the adequacy of the use of technological signals for fire detection in areas/rooms with harsh environment, in particular high radiation, through FSA.

Implementation status:

The Licensee reviewed the relevant regulatory and documentation requirements, as well as the provisions included in the Fire Probabilistic Safety Assessment (PSA). The Nuclear Fire Protection Code addresses the areas described in the AFI, while the Fire PSA specifically evaluates the plant rooms with respect to core damage. Furthermore, within the periodically reviewed fire hazard analysis, the expected frequency of functional failure assessed for these areas does not reach the threshold that would justify the introduction of corrective measures. The basic requirement is that fire compartments containing technological rooms shall be provided with full fire detection coverage, however, requirement 6.9. of BM Decree 5/2015. (II. 27.) states that “Fire compartments containing technological rooms shall be equipped with full fire detection coverage. Areas may be excluded from protection where radiation or climatic conditions do not allow the reliable operation of detectors.”

The Fire Hazard Analysis (FHA) did not identify these areas as critical; therefore, no safety-enhancing measures have been defined to date. The currently valid Fire PSA includes all plant rooms that have a measurable impact on the expected frequency of fire-induced core damage. The assessment also covers those areas where fire detection systems cannot be installed due to extreme environmental conditions, such as high temperature or elevated radiological levels. Within the analysis, fire detectors are considered as means of facilitating fire suppression through earlier detection. However, the results do not support the need to install fire detection systems in such non-manageable rooms, as their contribution to core damage frequency is negligible. From a functional perspective, fire detection systems only reduce the time required to detect a fire; they are not, in themselves, elements of the extinguishing process. In these areas, the installation of automatic fire suppression systems is not justified due to the risk of spurious actuation, and even in the event of a fire alarm, rapid access by firefighting teams cannot be ensured. Consequently, neither fire spread nor the extent of equipment rendered inoperable by fire can be effectively reduced by installing fire detection systems in these rooms. The re-evaluation was documented by the licensee and was also submitted to the HAEA.

The corrective action is considered **completed.**

2.5.2 Applicability to represented installations

No other represented installations were identified.

2.6 AFI (6) – Budapest Research Reactor

Insufficient physical separation between redundant safety-related components (i.e. diesel generators, ventilators).

2.6.1 Identified action(s) and implementation progress

Identified corrective action(s):

- Investigate possibilities for higher physical separation between redundant safety related components
- Implement modifications deemed feasible for the facility

Implementation status:

The emergency diesel generators will be replaced with outdoor diesel generators as part of the reactor licence renewal project. The design and licensing of the new diesel generators are currently underway, and completion, including installation, is expected in October 2026. With this renovation, the Licensee also aims to address fire safety issues.

The corrective actions are expected to be implemented by **October 2026**.

2.6.2 Applicability to represented installations

No other represented installations were identified.

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

According to the template provided for the National Action plan the current section includes weaknesses listed in the CRR, but not addressed via Section 2 of the action plan.

3.1 NPP/Paks NPP (Unit 1,2,3,4)

3.1.1 Fire Safety Analysis

3.1.1.1 Weaknesses identified in the self-assessment

No additional weaknesses were identified in this field.

3.1.2 Fire Prevention

3.1.2.1 Weaknesses identified in the self-assessment

No additional weaknesses were identified in this field.

3.1.3 Passive Fire Protection

3.1.3.1 Weaknesses identified in the self-assessment

No additional weaknesses were identified in this field.

3.1.4 Active Fire Protection

3.1.4.1 Weaknesses identified in the self-assessment

No additional weaknesses were identified in this field.

3.2 Research Reactor/Budapest Research Reactor (BKR)

3.2.1 Fire Safety Analysis

3.2.1.1 Weaknesses identified in the self-assessment

No additional weaknesses were identified in this field.

3.2.2 Fire Prevention

3.2.2.1 Weaknesses identified in the self-assessment

In relation to the age of the buildings, during the reinforcement of the structural elements and conservation activities, there is a need to check the installation of materials complying with the fire protection requirements.

Identified actions and implementation status

The action was to verify that fire prevention was taken into consideration during the material selection process for the reinforcement of the structural elements and conservation activities. In line with the expectations during the renovation of the BKR research reactor's facade, fire barrier elements were installed in the facade insulation to prevent the spread of fire between floors. In addition, the facade insulation material was selected in accordance with fire safety requirements, and the entrance doors were also replaced.

The weakness is considered **eliminated**.

3.2.3 Passive Fire Protection

3.2.3.1 Weaknesses identified in the self-assessment

No additional weaknesses were identified in this field.

3.2.4 Active Fire Protection

3.2.4.1 Weaknesses identified in the self-assessment

No additional weaknesses were identified in this field.

3.3 Research Reactors/Training Reactor of the Budapest University of Technology and Economics (BME OR)

3.3.1 Fire Safety Analysis

3.3.1.1 Weaknesses identified in the self-assessment

No additional weaknesses were identified in this field.

3.3.2 Fire Prevention

3.3.2.1 Weaknesses identified in the self-assessment

During on-site inspection, the different authorities involved in fire protection oversight identified that in certain areas within the facility a large amount of unnecessary flammable materials were detected in close proximity to cables relevant from the point of nuclear safety and that the Licensee does not keep an inventory/log on the flammable materials transported into the facility (e.g.: packaging materials, paints, etc).

Identified actions and implementation progress

All the identified unnecessary flammable material were removed from the facility in line with the regulatory expectations within two weeks after the observation. In order to avoid similar situations in the future new procedures are currently under development in line with AFI(2) by the Licensee, which aims to make sure that all significant flammable material transported into the facility will be logged and their timely removal can be ensured and verified through these records.

The weakness is considered **eliminated**.

3.3.3 Passive Fire Protection

3.3.3.1 Weaknesses identified in the self-assessment

No additional weaknesses were identified in this field.

3.3.4 Active Fire Protection

3.3.4.1 Weaknesses identified in the self-assessment

No additional weaknesses were identified in this field.

3.4 Spent Fuel Storage Facility (dry)/Interim Spent Fuel Storage Facility

No weaknesses were identified.

3.5 Additional findings

3.5.1.1 Weaknesses identified in the self-assessment

The following observation was made during the self-assessment regarding the regulatory oversight practice at the Paks NPP: “Regulatory on-site inspections are carried out as scheduled which typically takes place during shutdowns.”

Identified actions and implementation progress

Regarding this weakness a discussion and review of the current practice has taken place. It was confirmed that for those operational areas of the PAE that cannot be accessed under normal operating conditions/during power operation the fire protection authority carries out the necessary fire protection-themed inspections during the planned shutdowns on a 15-month cycle. For one power plant unit, this represents an average of 5-10 inspections during the very short period of the planned shutdown. However, it was also concluded that, this cycle is complemented by the continuous official inspections of areas that can be accessed and inspected during normal operating conditions. In accordance with the inspection cycle period prescribed by the relevant legislation, the fire protection authority carries out a complete, comprehensive inspection of the facility every 5 years. The monitoring of these external areas extends, for example: to the entire reactor buildings, turbine halls, control rooms, associated electrical and mechanical areas, and as well as other supporting buildings and related areas. According to the most recent records, the past few years the fire protection authority has typically carried out 20-25 inspections of this type each year.

In summary, an average of 24-33 fire safety inspections are carried out annually in the PAE area, which was considered sufficient hence **no further action** was deemed necessary.

3.5.1.2 Weaknesses identified in the self-assessment

The following observation was made during the self-assessment regarding research reactors: “There is a persisting issue regarding the sufficiency of staffing of these facilities which pose a continuous obstacle on carrying out scheduled tasks on time. The issue arises from the shortage of the nuclear expert community and strict requirements on the qualifications of these experts, which significantly limits the number of available experts.”

Identified actions and implementation progress

As a general challenge or weakness, the issue of staffing for research reactors were identified both during the self-assessment and mentioned in the CRR as well. The issue doesn’t directly challenge nuclear safety or fire safety, since minimal staffing requirements are set in the regulations to avoid situations where lack of adequate staffing could directly result in loss of operating capabilities, but rather slows down certain processes and actions of the operating organizations. As it was discussed during the TPR II process this challenge is present in many countries with operating research reactors. We consider the topic as well as the solution to go beyond the scope of the TPR II process but should be kept in mind for planning for the future of such facilities both from the perspective of the regulators and the licensees.

Based on this conclusion, **no further action** was deemed necessary.

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

4.1 Applicability of good practices identified in the peer review

No good practice was identified as applicable to Hungary.

4.2 Applicability of national areas of good performance in other countries

The Good Practice No. 3 identified in the Summary Report [4], titled “A dynamic system to manage storage areas for transient fire loads and other non-combustible materials,” attracted the interest of the Paks NPP. The facility where this good practice was identified has been contacted, and efforts were initiated to establish communication; however, no response to inquiries of the Paks NPP has been received to date.

4.3 Applicability of national areas of improvement in other countries

No national area of improvement was identified as applicable to Hungary.

5. Overall conclusions

In line with the expectations of the TPR II project corrective actions were identified to address weaknesses and areas for improvement in the operating nuclear facilities in Hungary. Most of the actions formulated throughout the TRP II process are already implemented at the time of submission of the NAcP and the remaining actions are planned to be resolved with the deadlines presented in Annex A. The HAEA and the National Directorate General For Disaster Management, Ministry Of The Interior (BM OKF) monitored and will continue to monitor the progress made by the licensees regarding the implementation of the corrective actions. Overall, it was concluded that while some delays were suffered for certain actions, the progress of the corrective actions is clearly observable and delays were reasonably justified.

The HAEA and the BM OKF took the opportunity to extend the original scope of the TPR II process and carry out a gap analysis between the WENRA SRLs and the Hungarian legal and regulatory framework in the field of fire safety, to ensure that all relevant requirements are adequately covered. The results of this gap analysis were presented in the NAR for every chapter and every relevant requirement mentioned by the Technical Specifications document [5]. Based on this gap analysis, it was concluded that in the field of fire safety, the Hungarian legal and regulatory framework provides a good coverage for the WENRA SRLs, but a few minor gaps were also identified Overall, 5 amendments were proposed by the TPR II participants. These are corresponding with the results of the gap analysis and the necessary modifications to the legal and regulatory framework are under consideration. The proposed actions based on this gap analysis is presented in Annex D.

Beyond the necessary corrective actions several good practices and areas of good performances were identified both by the self-assessment and the ENSREG experts and shared through the National Assessment Report and the CRR.

6. References

[1] National Assessment Report of Hungary for the Topical Peer-Review “Fire Protection” under Council Directive 2014/87/EURATOM, October 2023

[2] 2nd Topical Peer Review – ‘Fire Protection’, Country Review Report, Hungary, January 2025

[3] 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; ENSREG, 30/10/2025

[4] 2nd Topical Peer Review Summary Report "Fire Protection", European Nuclear Safety Regulators Group, May 2025

[5] Topical Peer Review 2023, Fire Protection, Technical Specification for the National Assessment Reports, 21 June 2022

7. Abbreviations

AFI	Area For Improvement
BKR	HUN-REN Energiatudományi Kutatóközpont - Budapesti Kutatóreaktor – HUN-REN Centre for Energy Research – Budapest Research Reactor
BM	Belügyminisztérium / Ministry Of The Interior
BME	Budapesti Műszaki és Gazdaságtudományi Egyetem / Budapest University of Technology and Economics
BME OR	Budapesti Műszaki és Gazdaságtudományi Egyetem – Oktatóreaktor / Budapest University of Technology and Economics – Training Reactor
BM OKF	Belügyminisztérium Országos Katasztrófavédelmi Főigazgatóság / National Directorate General For Disaster Management, Ministry Of The Interior
CRR	Country Review Report
ENSREG	European Nuclear Safety Regulators Group
FBOS	Földrengés Biztonsági Osztály (Seismic Safety Class)
FHA	Fire Hazard Analysis
FPR	Tűzvédelmi Szabályzat / Fire Protection Regulation
FSA	Fire Safety Assessment
HAEA	Országos Atomenergia Hivatal / Hungarian Atomic Energy Authority
KKÁT	Kiégett Kazetták Átmeneti Tárolója - Spent Fuel Interim Storage Facility
NAcP	National Action Plan
NAR	National Assessment Report
NFSC	Nuclear Fire Safety Codes
NPP	Nuclear Power Plant
NSC	Nuclear Safety Codes
PAE	MVM Paksi Atomerőmű Zrt. – MVM Paks NPP Ltd.
PSA	Probabilistic Safety Assessment
RHK Ltd.	Radioaktív Hulladékokat Kezelő Kft. / Public Limited Company for Radioactive Waste Management
SRL/RL	Safety Reference Level/Reference Level
SSC	Structures, Systems and Components
TPR	Topical Peer Review
WENRA	Western European Nuclear Regulators' Association

Annex A - Summary table of the actions planned/implemented

Section of NAcP	Reference no of the finding	Installation type/name (as relevant)	Thematic	Finding	Action (specify if planned/underway/completed)	Deadline	Regulatory authority's comment on progress
4	PAE1	NPP-PAE	Administrative	Periodic reviews are carried out but the highlighting/marking of this task in accordance with the NFSC (Decree 5/2015. (II.27.) of the Ministry of the Interior, Annex I, 10.11; 11.6) does not appear in the local Fire Protection Regulation.	Add a reference to the periodic review of the fire safety analysis in Chapter 2.1.1 of the local Fire Protection Regulation.	-	Completed
4	PAE2	NPP-PAE	Administrative	In the local Fire Protection Regulation and the FIB403 procedure, the reference to the repealed Government Decree 118/2011. appears instead of the currently valid HAEA Decree 1/2022.	In the case of the local Fire Protection Regulation and FIB403 procedure, the incorrect references will be corrected during the next review cycle.	-	Completed
3	AFI(3)	NPP-PAE	Active fire protection	Lack of detector for an area with combustible materials temporary storage.	Install flame detectors in the transverse corridor A008/4-4 and A008/2-2.	End of 2026	In progress
-	AFI(4)	NPP-PAE	FSA	Fire detection systems for buildings other than the reactor and turbine buildings and water extraction plant are not seismically qualified and not independent between adjacent compartments. A risk-based justification is not provided.	Re-evaluate the current FSA, from the point seismic qualification needs for fire detection equipment.	-	Completed
-	AFI(5)	NPP-PAE	FSA	There is a need to reassess the detection strategy in area/rooms with harsh environment, in particular high radiation, according to FSA, and consider the adoption of appropriate fire detection solutions where needed.	Re-assess the adequacy of the use of technological signals for fire detection in areas/rooms with harsh environment, in particular high radiation, through FSA.	-	Completed
4	BKR1	RR- BKR	FSA	A comprehensive up-dated version of the local Fire Protection Regulation based on the results of the recent fire risk analysis was not finalized and submitted for regulatory approval.	The development of a new local Fire Protection Regulation based on the regulations in force and the results of the most recent fire risk analysis.	-	Completed
4	BKR2	RR- BKR	Fire prevention	The old diesel fuel tanks were identified as unnecessary.	The decommissioning and elimination of the old diesel fuel tanks (6,72 m^3) and their replacement with the 160 l fuel tanks.	-	Completed
4	BKR3	RR- BKR	Administrative	The Licensee failed to submit fire safety related documentation previously requested by the BM OKF due to miscommunication.	The requested documentation shall be submitted as soon as possible to the BM OKF and the HAEA.	-	Completed
4	BKR4	RR- BKR	Fire prevention	During the site visit by the co-authorities a significant amount of unnecessary combustible materials were spotted in the reactor hall, which is in violation of the regulations strictly requiring the minimization of such materials.	The correction of the non-compliances with the regulations and the removal of unnecessary combustible materials from the reactor hall.	-	Completed
4	BKR5	RR- BKR	Fire prevention	During the site visit by the co-authorities a significant amount of unnecessary combustible materials were spotted in the measurement hall, which is in violation of the regulations strictly requiring the minimization of such materials. During the inspection of the related internal	The correction of the non-compliances with the regulations and the removal of unnecessary combustible materials measurement hall in line with the proposal of the 2022 walk-down report.	-	Completed

				walk down reports it was concluded that the operator organization already identified this issue during a 2022 walk-down and proposed corrective actions, but these were only carried out partly.			
…	BKR6	RR- BKR	Administrative	In the Sz-1.18 internal procedures (The use of the experimental equipment of the Budapest Research Reactor) there is no requirement to take into consideration fire safety in the planning of modifications.	The Sz-1.18 internal procedure shall include the aspects of fire safety to be taken into consideration during the designing of modifications.	-	Completed
…	BKR7	RR- BKR	Administrative	The local Fire Protection Regulation of the licensee does not set responsibilities in a coherent and clear manner regarding identified non-compliances and activities that may increase fire risk in cases when the issue is outside of the authorial zone of the Operator organization. Because of these hazardous situations may occur and persist for a long time within the facility, such as the case of the significant amount of unnecessary combustible materials without anyone responsible of its removal.	The local Fire Protection Regulation should be complemented/amended in a manner that sets clear responsibilities when a source of fire hazard is identified outside of the authorial zone of the Operator organization.	-	Completed
4	BKR8	RR- BKR	Administrative	There is no requirement set in the local Fire Protection Regulation of the Licensee that the document should be reviewed and updated at least on a yearly bases by the fire protection officer. Furthermore while there are requirements for the fire protection officer that the changes in the domestic legal and regulatory framework shall be taken into consideration during these updates it was discovered during the on-site inspection that are references to legal requirements that were repealed 9 years ago indicating that the task of monitoring the changes in the legal and regulatory framework is not carried out properly. Last but not least the current wording on the validity of the current version of the local FPR states that the document is valid until repeal, which is not in line with the practice of continuous update and amendment.	The local Fire Protection Regulation of the Licensee should be complemented by addition requirements stating that the document shall be updated at least on an annual basis and that the changes in the legal and regulatory framework should be considered as a priority during these revisions. Furthermore the FPR statement on validity shall be modified in a manner to be in line with the related statements in the document.	-	Completed
4	AFI(1)	RR- BKR	Administrative	The site conditions create conflicting responsibilities between the site owner and reactor operator organisation, which complicates the approval processes for certain modifications or corrective actions	Investigate solutions to clarify and separate responsibilities of the different actors of the site (e.g.: through bi-lateral/multi-lateral agreements or procedures and requirements)	End of 2026	In progress
3	AFI(6)	RR- BKR	Passive fire protection	Insufficient physical separation between redundant safety- related components (i.e. diesel generators, ventilators). The insufficient physical separation between redundant safety-related components creates a risk of common cause failure due to potential propagation of a fire.	• Investigate possibilities for higher physical separation between redundant safety related components • Implement modifications deemed feasible for the facility	2026 October	In progress
2	BME1	RR-BME	FSA, Administrative	The Licensee has not finished the development of the fire risk analyses and the internal Fire Protection Regulation	The fire risk analysis has to be finished.	-	Completed

				of the facility on time set by the HAEA resolution OR-HA0008.			
4	BME2	RR-BME	Administrative	The local Fire Protection Regulation of the facility refers to expired and withdrawn regulations instead of the currently valid regulations set by the HAEA Decree 1/2022.	The validity of the referred legal documents in the local Fire Protection Regulation of the facility has to be checked and updated. (Due to human resource issues in the field, the task is delayed to October, 2026.)	2026 October	In progress
4	BME3	RR-BME	Administrative	There are no requirements or procedures set in the internal process control system of the Licensee to monitor changes in the domestic and international regulations and methodologies and update the Fire Protection Regulation accordingly.	The internal process control system of the Licensee has to be amended in a way to cover the requirements and responsibilities regarding the monitoring of changes in the domestic and international regulations.	-	Completed
3	BME4	RR-BME	Fire prevention	In certain areas within the facility a large amount of unnecessary flammable materials were detected in close proximity to cables relevant from the point of nuclear safety.	The unnecessary flammable materials has to be removed from the facility.	-	Completed
3	AFI(2)	RR-BME	Administrative, Fire prevention	The Licensee does not keep an inventory/log on the flammable materials transported into the facility (e.g.: packaging materials, paints, etc.).	The procedural framework to track and monitor flammable material transport into the facility has to be developed.	End of 2026	In progress
4	AFI(1)	RR-BME	Administrative	The site conditions create conflicting responsibilities between the site owner and reactor operator organisation, which complicates the approval processes for certain modifications or corrective actions.	Investigate solutions to clarify and separate responsibilities of the different actors of the site (e.g.: through bi-lateral/multi-lateral agreements or procedures and requirements)	End of 2026	In progress
4	KKÁT1	SFSF -KKÁT	Administrative	In the process control system of RHK Ltd., the local Fire Protection Regulation do not specify who should be notified by the operational staff in case of a fire protection relevant detection.	The local Fire Protection Regulation shall state that in the event of a fire safety relevant detection, the operational staff shall notify a member of the fire safety organisation.	-	Completed

Annex B - Summary of Good Practices (for information)

Ref. no.	Good Practice
GP-PAE1	In the case of the PAE the increased interest in participation in international programs, getting to know the professional experiences of foreign nuclear facilities, getting to know the regulations of other countries and international organizations was considered as a good practice since it has a positive effect on the evaluation of the professional practice of one's own country.
GP-PAE2	PSA models and documentation of the PAE is updated at least on a yearly basis, taking into consideration any and all modification to the design as well as the operator experience and both the models and the documentation is submitted in its full content to the HAEA. This practice ensures that the regulatory body has up-to-date information on the various risks of the facility (fire risk included) and supports the HAEA in various PSA based regulatory applications.
GP-BKR1	Compared to the site of the staff a high amount of the reactor operator personnel has fire safety engineer certification and that the operator personnel go through on a fire safety training on a yearly basis in order to be able to identify potentially hazardous situations and events during the daily scheduled walk-downs.
GP-BME1	During the 2016 reconstruction of the BME OR reactor building the Licensee made it one of its priorities to remove all unnecessary and potentially combustible materials (paper, wooden furniture, etc.) from the building. This resulted in a clean and safe working area, while ensuring fire prevention through the lack of combustible materials.
GP-BME2	Even in the absence of some relevant regulations, the safety culture related to fire protection is of a high standard and implemented with sufficient responsibility. The content elements of the fire protection regulations mainly meet the special requirements arising from the facility. Based on the on-site inspection, the responsibilities for all professional issues are clear, and the persons responsible for the given task are aware of their obligations.
GP-KKÁT1	The Licensee provides continuous feedback of fire safety experience through dedicated training sessions, in addition to the minimum requirements set out in the internal Fire Protection Regulation.
GP-KKÁT2	The Licensee provides a dedicated form (Ny 1940-01) prior to the planning of the modifications can be considered as an identified good practice, which helps the designer to identify and take into account the fire safety aspects.

Annex C - Compilation of National Areas of Good Performance (for information)

Ref. no.	Finding	Identified in the TPR for the installation
NPPs		
HU-AGP-1	There is a permanent presence of a well-resourced on-site fire brigade.	Paks NPP (HU)
RESEARCH REACTORS		
HU-AGP-2	A significant number of the staff and reactor operator personnel are certified fire safety engineers.	Budapest Research Reactor (HU)

Annex D - Compilation of National Areas for Improvement (for information)

Ref. no.	Finding	Identified in the TPR for the Installation
NPPs		
HU-AFI-3	Lack of detector for an area with combustible materials temporary storage.	Paks NPP (HU)
HU-AFI-4	Fire detection systems for buildings other than the reactor and turbine buildings and water extraction plant are not seismically qualified and not independent between adjacent compartments. A risk-based justification is not provided.	Paks NPP (HU)
HU-AFI-5	There is a need to reassess the detection strategy in area/rooms with harsh environment, in particular high radiation, according to FSA, and consider the adoption of appropriate fire detection solutions where needed.	Paks NPP (HU)
RESEARCH REACTORS		
HU-AFI-2	No inventory of the flammable materials transported into the facility (e.g. packaging materials, paints).	Budapest Training Reactor (HU)
HU-AFI-1	The site conditions create conflicting responsibilities between the site owner and reactor operator organisation, which complicates the approval processes for certain modifications or corrective actions.	RRs (HU)
HU-AFI-6	Insufficient physical separation between redundant safety-related components (i.e. diesel generators, ventilators).	Budapest Research Reactor (HU)