CSN CONSEJO DE SEGURIDAD NUCLEAR

National Action Plan
Fire Protection in
Spanish Installations.
2026

Second Topical Peer Review: Fire protection at nuclear installations

1 Introduction 3
2 Follow-up of findings from the peer review – national areas for improvement 3
2.1 Area for improvement (1) – NPP / Applicable to All NPP 3
2.1.1 Identified action and implementation progress 4
2.1.2 Applicability to represented installations 4
2.2 Area for improvement (2) – Fuel Cycle Installation / Juzbado 4
2.2.1 Identified action and implementation progress 4
2.2.2 Applicability to represented installations 4
3 Follow-up of other findings resulting from the self-assessment 4
3.1 FCF / Juzbado 5
4 Consideration of the other findings from the peer review to enhance fire protection 5
4.1 Applicability of good practices identified in the peer review 5
4.1.1 GP – 1 Implementing learning from experience feedback from fire events in non-nuclear settings 5
4.1.2 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. 6
4.1.3 GP – 3 - A dynamic system to manage storage area for transient fire loads and other non-combustible materials 6
4.1.4 GP – 4 - Thermographic cameras installed on worksites or, in case of the failure of a detector, with different detection zones and alarms. 7
4.2 Applicability of national areas of good performance in other countries 7
4.3 Applicability of national areas for improvement in other countries 7
5 Overall conclusions 7
References 9
List of acronyms 10
Annex A – Summary table of the actions planned/implemented 11
Annex B – Compilation of Good Practices 12
Annex C – Compilation of National Areas of Good Performance 13
Annex D – Compilation of National Areas for Improvement 16

1 Introduction

The final reports of second topical peer review (TPR II) under the Nuclear Safety Directive were issued in the spring of 2025. National areas of good performance and national areas for improvement [as relevant] are described in the 22 individual Country Review Reports (CRR). The review also identified both good practices and challenges at the EU-level, which are detailed in the Summary Report (SR) [1].

According to the Nuclear Safety Directive (recital 23, 3rd paragraph) [2] *"…Member States should establish national action plans for addressing any relevant findings and their own national assessment, taking into account the results of those peer review reports."* The TPR II technical specification (TS) also acknowledges the opportunity to reflect on peer review outcomes stating, *"There are different practices in implementation of fire protection among installations, which gives the opportunity to learn from each other and share experiences"* and that *"…the results of TPR II can lead to new insights*".

According to the TPR II terms of reference [3], "*On the basis of the relevant CRR, each country will prepare a specific National Action Plan that will be published … on the ENSREG website. The actions shall be as specific as possible to each installation. A template for the National Action Plan will be provided after the peer review phase*". Furthermore, "*Each country will also inform on the progress of the implementation of the actions included in the action plan based on a follow-up schedule of at least 3 years, as defined in the ENSREG Action Plan."*

It should be recalled that national assessments identified both candidate installations and represented ones. The TS mentions that *"…Insights from the TPR should be transferrable to these represented installations."*

Consequently, the TPR II Summary Report of the TPR Board [1], endorsed by ENSREG, reiterates these elements from the Directive and the TS: "*The National Action Plan should address the results of the self-assessment and respond to the country specific findings (CSFs) outlined in the country review report."* Furthermore, the Board recommends that "*…participating countries consider how the insights from the TPR, in particular their CSFs, are transferable to their "represented installations" when developing their NAcP. Additionally, the Board encourages participating countries to examine all findings from this peer review - regardless of their categorisation (good practice, area of good performance, area for improvement) - and assess their applicability to enhance fire protection."*

The current National Action Plan (NAcP) report documents all the actions carried out and ongoing planned by the Consejo de Seguridad Nuclear (Nuclear Safety Council) (CSN) in order to fulfil the requirements detailed above.

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

This section of the NAcP is dedicated to the country specific findings resulting from the peer review as reported in chapter 4 of the country's CRR [4]. It is structured by installation.

2.1 Area for improvement (1) – NPP / Applicable to All NPP

Licensees to make a better use of fire operational experience database, such as 'FIRE' by the OECD/NEA.

2.1.1 Identified action and implementation progress

In the conclusions of the NAR, as a result of the self-assessment, the need to encourage the use and active participation of licensees in projects focused on the analysis of operational experience regarding fire-related events was identified.

Accordingly a process was put in place in order to establish the appropriate national framework to allow and foster the active participation of the Spanish NPP licensees in the NEA/OECD FIRE project, currently in its 8th Phase.

The text of the agreement that establishes the national framework is currently in its last phase of comments, the basis of the contract has already been agreed between the CSN and the licensees and is expected to be signed by all the parties by the end of 2026.

2.1.2 Applicability to represented installations

The agreement that establishes the framework to allow the active participation of the Spanish NPP in the NEA/OECD FIRE project will be signed by the group that represents all NPPs in Spain and all NPPs will actively work sharing and obtaining information to and from the project database. CSN will review the implementation of this process.

2.2 Area for improvement (2) – Fuel Cycle Installation / Juzbado

Need for consideration of the radiological risks in the Fire Hazard Analysis.

2.2.1 Identified action and implementation progress

Juzbado has recently gone through the Periodic Safety Review process prior to obtain its operating permit. In its approval the CSN established some requirements related to their Fire Hazard Analysis as are included in the documents CSN/C/P/MITECO/JUZ/26/01 “Favorable report on the renewal of the operating authorisation for the Juzbado fuel fabrication plant” [5] and CSN/ITC/SG/JUZ/26/06 “Complementary Technical Instruction associated with the 10th Condition of the Annex on Nuclear Safety and Radiological Protection Limits and Conditions of the Operating License” [6]. Both documents require the adoption by Juzbado fuel cycle installation to the NUREG-1520 rev. 2 “Standard Review Plan for nuclear fuel cycle facilities license applications” [7] and the second document requires specifically to adapt the safety analysis of the installation to the criteria reflected in NUREG-1520 to carry out the entire process within a three-year timeframe. The adoption of NUREG-1520 rev. 2 shall result in an updated fire hazard analysis that will consider fire-induced radiological.

2.2.2 Applicability to represented installations

There is no other Fuel Cycle installation in the country so this AFI is not applicable to any other Spanish installation.

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

This section of the NAcP is dedicated to the findings from the self-assessment, as reported in chapter 3 of the CRR, which contains the weaknesses identified in the self-assessment. It is based on the fire-protection thematics as per the Technical Specification.

The NAR [8] included as areas for improvement:

1. For the NPP: Encourage the use and active participation of licensees to make a better use of fire operational experience databases.
2. For Juzbado FCF: As part of the processes of on-going improvement and analysis of the standards that is going to be carried out during the Periodic Safety Review of the operating permit for the Juzbado facility, the licensee will be requested to study specific standards available, including IAEA guidelines, in order to develop a fire protection programme that consolidates and addresses with a global approach all the analyses currently being performed by the licensee and the measures already adopted from the point of view of prevention and passive and active protection.

The first conclusion has already been included in the previous chapter as it was identified as an AFI in the SR so it will not be described further in this chapter.

3.1 FCF / Juzbado

Although related to the Area for improvement described in the previous section 2.2, additional activities have been carried out in order to implement the AFI identified in the NAR [8].

During the Periodic Safety Review process related to its recent operating permit approval, Juzbado's licensee committed themselves in the report INF-EX-021276 "Commitments acquired by Juzbado fuel cycle facility in relation to the preliminary conclusions resulting from the evaluation of the PSR" [9] to include the analysis of the NFPA-801 (2025) [10] and establish a fire protection program to deal with the deviations identified. This activity should be carried out in a period of six months after the permit issuance.

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

This section of the NAcP is dedicated to the good practices identified at EU level, and areas of good performance/areas for improvement for other countries mentioned in the TPR Summary report.

4.1 Applicability of good practices identified in the peer review

The peer review identified the following four good practices as detailed in annex B.

4.1.1 GP – 1 Implementing learning from experience feedback from fire events in non-nuclear settings

NPP in Spain currently carry out fire drills on an annual basis with the support of the external local fire departments. In the framework of these drills the internal and external fire brigades share knowledge and experience applicable to the facilities, hence the CSN considers there is no need to develop additional activities to gain experience from fire events in non-nuclear settings. Nevertheless, as detailed in chapter 2, the CSN and the NPP are to sign an agreement in order to establish the appropriate framework to allow the active participation

of the Spanish NPP licensees in the NEA/OECD FIRE project, currently in its 8th Phase. Through this framework, Spanish NPPs will be able to gain insights from the operating experience shared and discussed in the project.

4.1.2 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.

The CSN is currently working on the Fire Risk Assessment through Innovative Research (FAIR) Project (also within OECD/NEA), which is a follow-up of the PRISME project series. This project addresses new fire scenarios and new topics of interest for an improved fire risk assessment in nuclear power plants (NPPs) and other nuclear facilities. It covers three major topics:

1. fire propagation along cable trays with a focus on the effects of long-length cables and cable ageing,
2. fires in confined and in mechanically ventilated compartments, with a focus on the effects of hot and vitiated environments on the combustion and re-inflammation of unburned gases,
3. multi-source and multi-compartment scenarios, with a focus on fire propagation between discrete sources and smoke propagation in complex multi-compartment configurations.

Additionally, the CSN has signed an agreement with the University of Cantabria. Under this agreement the University de Cantabria provides the CSN with technical and expert support in analysing specific fire scenarios with potential impact on the safety of a given NPP.

Finally, the CSN is in contact with international experts in order to keep up with the state of the art knowledge on fire phenomena. As an example, the CSN is included as an end-user in the BENEFIT (Battery fires in nuclear facilities) project currently under development within the OECD/NEA in order to analyse the phenomena of Li-ion battery fires and develop fire detection and mitigation strategies.

Taking into account the current activities carried out, the CSN believes there is no need for further activities related to this good practice.

4.1.3 GP – 3 - A dynamic system to manage storage area for transient fire loads and other non-combustible materials.

Currently and as required by the regulation, the NPPs must have transient fire load control procedures in place, procedures that are supervised by the Internal hazard department at the CSN through its periodic inspections to licensed nuclear facilities in order to ensure that all combustible materials and fire loads are appropriately controlled and that new fire protection measures are put in place if needed. The CSN believes there is no need for further activities related to this good practice.

4.1.4 GP – 4 - Thermographic cameras installed on worksites or, in case of the failure of a detector, with different detection zones and alarms.

The CSN fire regulation IS-30 sets the provisions applicable to detection systems for NPPs. Additionally, in case of non-functionality of a detection system required by the IS-30, the licensees must put compensatory measures in place.

Some Spanish NPPs already include the use of thermographic cameras or video cameras in specific areas either as detection or confirmatory means or their use is foreseen as compensatory measures and as additional equipment of the fire brigade, while other plants are currently developing “robots” that could be used in specific areas in case of a failure of active fire protection features. These robots may incorporate fire detectors of diverse technologies and a thermographic camera.

Taking into account the current requirements and the activities carried out, the CSN believes there is no need for further activities related to this good practice.

4.2 Applicability of national areas of good performance in other countries

The CSN has reviewed the areas of good performance in other countries and has analysed the current requirements and the activities already in place in relation to the fire protection and considers that there is no need for further activities additional to those already mentioned above in this report.

4.3 Applicability of national areas for improvement in other countries

The CSN has reviewed the areas for improvement in other countries and has analysed the current requirements and the activities already in place in relation to the fire protection and considers that there is no need for further activities additional to those already mentioned above in this report.

5 Overall conclusions

As a result of the analysis of the Summary Report, the Country review report and the National Assessment report, the CSN has carried out the following activities:

1. Use of fire operating experience by Spanish NPPs.

   The CSN and the Spanish NPP licensees will sign an agreement by the end of 2026 to establish the national framework for active participation in the OECD/NEA FIRE project. This action will allow Spanish NPPs to systematically use international fire operating experience and to assess its applicability to their fire protection programmes, fire safety analyses and plant procedures.

2. Review of the Juzbado Fire Hazard Analysis.

   The Juzbado fuel fabrication facility will adapt its safety analysis to the criteria of NUREG-1520 Rev. 2. This will include the revision of the Fire Hazard Analysis to explicitly consider fire-induced radiological and chemical hazards. The implementation of this requirement including derived modifications shall be completed by July 2029.

3. Improvement of the Juzbado fire protection programme

As part of the Periodic Safety Review process, the Juzbado licensee has self-committed the following action Analysis of the NFPA-801 (2025) [10] and establish a program to deal with the deviations identified. This activity should be carried out in a period of six months after the permit issuance (July 2026).

The CSN will follow up the implementation of the actions included in this National Action Plan through its established regulatory oversight processes, including document reviews, inspections, follow-up meetings and, where appropriate, specific regulatory requests. The follow-up will focus not only on the formal completion of the actions, but also on the effectiveness of the implemented measures in improving fire protection, fire safety analyses and the use of operating experience.

References

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

[2] 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

[3] Terms Of Reference for the Topical Peer Review process on Fire Protection. HLG-r (2022-49)_646 ToR TPR Review Process on Fire Protection.

[4] European Nuclear Safety Regulators Group ENSREG, 2nd Topical Peer Review – "Fire Protection" Country Review Report Spain. January 2025.

[5] CSN/C/P/MITECO/JUZ/26/01 "Favorable report on the renewal of the operating authorization for the Juzbado fuel fabrication plant"

[6] CSN/ITC/SG/JUZ/26/06 "Complementary Technical Instruction associated with the 10th Condition of the Annex on Nuclear Safety and Radiological Protection Limits and Conditions of the Operating License"

[7] NUREG-1520 rev. 2 "Standard Review Plan for nuclear fuel cycle facilities license applications"

[8] National Assessment Report – Fire Protection in Spanish Installations. Topical Peer Review 2023.

[9] INF-EX-021276 "Commitments acquired by Juzbado fuel cycle facility in relation to the preliminary conclusions resulting from the evaluation of the PSR"

[10] NFPA-801 (2025) "Standard for Fire Protection Facilities Handling Radioactive Materials"

List of acronyms

Acronym	Meaning
TPR	Topical Peer Review
CRR	Country Review Report
SR	Summary Report
TS	Technical specification
ENSREG	European Nuclear Safety Regulators Group
CSF	Country Specific Findings
NAcP	National Action Plan
CSN	Consejo de Seguridad Nuclear (Nuclear Safety Council)
NEA	Nuclear Energy Agency
OECD	Organisation for economic co-operation
FIRE	Fire Incident Record Exchange
NPP	Nuclear Power Plant
PSR	Periodic Safety Review
NUREG	US Nuclear Regulatory Commission Regulation
AFI	Area for improvement
NAR	National assessment report
FCF	Fuel Cycle Facility
NFPA	National Fire Protection Association
RG	Regulatory Guide
EU	European Union
GP	Good Practice
BENEFIT	Battery Fires in Nuclear Facilities

Annex A – Summary table of the actions planned/implemented

Section of NAcP	Reference no of the finding	Installation type/name	Thematic	Finding	Action	Deadline	Regulatory Authority's comment on progress
2	AFI 1	All NPP	OPEX	Licensees to make a better use of fire operational experience database, such as 'FIRE' by the OECD/NEA.	Agreement between the CSN and the NPPs to establish the national framework for active participation in the NEA/OECD FIRE project, currently in its 8th Phase	December 2026	Agreement to be signed in the following months
2	AFI 2	Juzbado	Fire Safety Analyses	Need for consideration of the radiological risks in the FHA	The Juzbado fuel fabrication facility will adapt its safety analysis to the criteria of NUREG-1520 rev. 2 "Standard Review Plan for nuclear fuel cycle facilities license applications"	July 2029	Analysis and derived modifications should be finished by 2029 as it is a requirement to the operating permit
3	NAR sections 02.2.7.3 and 04	Juzbado	Fire protection program	Improvements in the Fire protection programme	Analysis of the NFPA-801 (2025) and development of a program to deal with the deviations identified.	January 2027	Analysis should be finished by January 2027 as it has been committed by the licensee

Annex B – Compilation of Good Practices

Ref. no.	
GP-1	Implementing learning from experience feedback from fire events in non-nuclear settings
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
GP-3	A dynamic system to manage storage area for transient fire loads and other non-combustible materials
GP-4	Thermographic cameras installed on worksites, or in case of the failure of a detector, with different detection zones and alarms.

Annex C – Compilation of National Areas of Good Performance

Ref. no.	Finding	Identified in the TPR for the installation
ALL/MULTIPLE INSTALLATIONS		
FR-AGP-7	Comprehensive national review after Lubrizol (chemical industry) fire accident resulting in ASN requests and consequently in concrete actions in all nuclear installations.	All installations (FR)
NL-AGP-1	Full-scope fire PSA in all operational states for Level 1 to 3 PSA.	Borssele NPP, HFR RR (NL)
UK-AGP-1	There is an independent verification of hot work in addition to the assessment by the 'Hot Work Selected Person' and review by the 'Hot Work Controller' for enhanced control of work areas.	All installations (UK)
UK-AGP-2	The nuclear sector-wide review of combustible cladding risks instigated by the nuclear regulator, to identify and implement any transferable learning from the Grenfell fire.	All installations (UK)
UK-AGP-4	Implementation of automatic fire suppression system to transporter tug engines across the site.	Sellafield (UK)
NPPs		
BE-AGP-1	A solid process is in place to manage the authorisations to have fire doors opened: the wedge to block the fire door can be collected at the Main Control Room after approval.	Tihange 3 NPP (BE)
BE-AGP-2	The existence of first-intervention teams (composed of operators) and second- intervention teams (composed of professional fire fighters) with proper equipment and, in the case of Tihange NPP-external firefighters quartered opposite the site, ensures an appropriate response to any fire event.	Tihange 3 NPP (BE)
BE-AGP-3	Use of a mobile scanner device with an intuitive IT tool and barcode on items to easily identify equipment or material allowed to be stored.	Tihange 3 NPP (BE)
BE-AGP-4	Implementation of a software tool to easily assess the adequacy of the fire protection measures.	Tihange 3 NPP (BE)
CH-AGP-2	Robustness of the fire detection system against single failure.	NPPs (CH)
CZ-AGP-1	A large professional fire brigade (FRSU) ranging from 12 to 18 depending on the NPP, is deployed on a permanent basis on the NPP site providing fire prevention, firefighting and rescue services.	NPPs (CZ)
CZ-AGP-2	A large modernisation of fire detection system has been carried out with the use of new generation, multi-criteria detectors.	NPPs (CZ)
ES-AGP-1	Implementation of effective flooding protection of critical equipment from the harmful effects of firefighting water extinguishing system.	Almaraz and Cofrentes NPP (ES)
ES-AGP-2	Detailed arrangements for the management of hot works are provided (covering e.g. scope of works, supervision, necessary firefighting equipment).	Cofrentes NPP (ES)
ES-AGP-3	New fire-fighting procedures and training have been implemented as a result of the lessons learnt from conventional industry.	Vandellos 2 NPP (ES)
FI-AGP-1	Use of a battery for powering fire valves and smoke removal valves for a period of at least 10 minutes as a compensatory measure.	Olkiluoto 3 (FI)
FI-AGP-2	Gas detectors are installed in premises where diesel generators are located which signal the leakage of combustible gases from fuel tanks.	Lovisa 1, 2 NPP (FI)

FR-AGP-1	Implementation of door-open alarms for the ones representing a safety risk (PSA based).	Tricastin 900 MWe NPP (FR)
FR-AGP-2	Implementation of thermal cameras on particular worksites providing an alarm in the main control room in order to be alerted of a fire outbreak.	NPPs (FR)
FR-AGP-3	Measures to be taken by the operators in the control room are pre-defined in written instructions (FAIOp).	NPPs (FR)
FR-AGP-4	High-level modelling of the effects of fire (soot, pressure effects…) to confirm the fire resistance of compartmentation elements and Structures, Systems, Components (SSCs) performance.	NPPs (FR)
HU-AGP-1	There is a permanent presence of a well-resourced on-site fire brigade.	Paks NPP (HU)
RO-AGP-1	Since 2022, a professional unit of firefighters (15 firefighters, 3 fire trucks) is deployed on a permanent basis on the Cernavoda NPP site.	Cernavoda NPP Unit 1 (RO)
SE-AGP-1	The design approach of the fire detection and alarm system is robust regarding the separation of redundant trains.	NPPs (SE)
SE-AGP-2	Measures to be taken by the operators in the control room are pre-defined in written instructions for every single fire compartment depending on the area affected. For complex spaces, intervention layouts (rooms, detectors and so on) and fire compartment layouts are complemented with specially developed intervention plans.	Ringhals 3 NPP (SE)
SK-AGP-1	A professional multi-functional fire brigade (minimum 18 staff) is deployed on a permanent basis on the NPP site. In addition, an external fire brigade is available whose intervention is planned in the event of a fire. The effectiveness of the joint intervention is verified via annual drills.	Mohovce 3, 4 NPP (SK)
TR-AGP-1	The presence of a well-resourced on-site fire brigade contributes to responding to fires in a timely and robust manner.	Akkuyu NPP (TR)
UA-AGP-1	An extensive and targeted modernisation programme of fire protection equipment and systems has been undertaken at the NPPs.	NPPs (UA)
UK-AGP-3	Fire doors and hatches which form part of the nuclear fire compartment have position monitoring that initiate an alarm in the MCR if the door is left open.	Hinkley Point C, Sizewell B and 2nd generation AGRs (UK)
RESEARCH REACTORS		
FR-AGP-5	Use of a semi-quantitative fire risk assessment methodology for each of the 600 rooms of the reactor building.	RHF RR (FR)
FR-AGP-6	Modernisation of the facility with significant improvements (both on passive and active components) including the ones in the frame of the PSR.	RHF RR (FR)
HU-AGP-2	A significant number of the staff and reactor operator personnel are certified fire safety engineers.	Budapest Research Reactor (HU)
NL-AGP-2	A systematic approach for combination of hazards is applied.	HFR RR (NL)
PL-AGP-1	Implementation of new and modern provisions, in particular to meet the current fire protection regulations.	MARIA, Swierk (PL)
TR-AGP-2	Formalised arrangements between the reactor facility and the city fire brigade contributes to an effective response in case of a fire.	ITU Research Reactor (TR)

DECOMMISSIONING		
IT-AGP-2	Permanent presence on the site of the research reactor under decommissioning of a well-resourced on-site fire brigade.	ESSOR RR - Decommissioning (IT)
SPENT FUEL STORAGE		
CH-AGP-1	Fires resulting from military aircraft crash were considered at the design stage of the spent fuel storage facility and also the radioactive waste storage buildings.	Zwilag SFS (CH)
SI-AGP-1	Fire resulting from large commercial aircraft crash are considered in the design basis in the deterministic studies for storage casks for spent fuel.	Dry SFDS Krško NPP site (SI)
WASTE		
IT-AGP-1	Fires resulting from a military aircraft crash onto waste buildings are considered at the design stage and compliance of the consequential impact with established radiological objectives verified.	OPEC2 and D2 EUREX - Waste (IT)

Annex D – Compilation of National Areas for Improvement

Ref. no.	Finding	Identified in the TPR for the installation
ALL/MULTIPLE INSTALLATIONS		
DK-AFI-2	Fire preventive measures rely to a higher degree on the adherence to operational procedures than on the structural and layout features of the building itself.	Risø site (DK)
LT-AFI-3	A need for standardisation 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.	All installations (LT)
UK-AFI-3	Holistic Fire Safety Strategies (FSSs) covering fire objectives: nuclear safety, life safety, property protection not currently available for all nuclear facilities.	Sellafield (UK)
NPPs		
BE-AFI-1	The verification and inspection process of the seals in fire resistant concrete dals is implemented but not yet integrated in all the maintenance procedures.	Tihange 3 NPP (BE)
BE-AFI-2	FSA should consider seismically induced fire.	Tihange 3 NPP (BE)
BG-AFI-1	The need for replacement of fire detectors due to ageing management.	Kozloduy Unit 5 NPP (BG)
CH-AFI-2	There are two different systems to support the fire load management. It does not allow to get information efficiently.	Leibstadt NPP (CH)
CH-AFI-4	There is a need to reassess the detection strategy in area/rooms with harsh environment, in particular high radiation, according to the FSA, and consider the adoption of appropriate fire detection solutions where needed.	All NPPs (CH)
CZ-AFI-1	The water fire extinguishing system which protects the cable compartments is obsolete.	Dukovany NPP (CZ)
ES-AFI-1	Licensees to make a better use of fire operational experience database, such as 'FIRE'	NPPs (ES)
FI-AFI-1	A need to complete replacement of old CO2-gas extinguishing systems, whose design basis does not comply with today's industrial standards.	Olkiluoto 1,2 NPP (FI)
FI-AFI-2	FSA should consider seismically induced fire.	Lovisa 1, 2 & Olkiluoto 1,2 NPP (FI)
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)
NL-AFI-1	Several automatic extinguishing systems do not fully comply with the current design requirements and regulations.	Borssele NPP (NL)
NL-AFI-2	The fire detection alarms are not simulated in the control room simulator.	Borssele NPP (NL)

NL-AFI-4	Automatic fire suppression is not guaranteed in case of SSE.	Borssele NPP (NL)
RO-AFI-1	Fire hydrants and piping not yet installed in the Reactor Building of Unit 1.	Cernavoda NPP Unit 1 (RO)
RO-AFI-3	The combination of fire and earthquake events is not systematically considered and documented in all nuclear installations, as applicable.	Cernavoda NPP Unit 1 (RO)
SI-AFI-1	Absence of multiple spurious operation (MSO) in FHA.	Krško NPP (SI)
SK-AFI-1	The intervention time of the intervention units may be delayed due to restricted access to certain rooms.	Mochovce 3,4 NPP (SK)
UA-AFI-1	A need to enhance fire hazard analysis by further development of deterministic analyses to specifically assess the potential consequences of fire events on the performance of the safety functions.	NPPs (UA)
RESEARCH REACTORS		
AT-AFI-1	Absence of fire extinguishing blankets that could prevent fires from developing and causing damage to the infrastructure.	TRIGA Mark II Vienna RR (AT)
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)
IT-AFI-1	Based on the FHA results, the fire protection system for RSV TAPIRO has to be improved, in particular with regard to the fire compartmentation and to the ventilation system.	TAPIRO Fast Neutron RR (IT)
NL-AFI-5	Inadequate management and qualification of isolation valves in the reactor building.	Hoger Onderwijs Reactor- HOR (NL)
NL-AFI-6	In the reactor building fire detectors are located only in the ventilation ducts.	Hoger Onderwijs Reactor- HOR (NL)
PL-AFI-1	Lack of automatic extinguishing systems.	MARIA, Świerk (PL)
PL-AFI-2	Lack of compartmentation or compensatory measures between redundant SSCs (UPS, diesel generators).	MARIA, Świerk (PL)
RO-AFI-2	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.	TRIGA Research Reactor in Pitesti (RO)
TR-AFI-1	Need for review and upgrading of the fire safety-related systems in order to adapt to the design requirements in the new regulation on fire safety of nuclear facilities.	İTÜ Research Reactor (TR)
TR-AFI-2	Due to the new regulation on fire safety, the licensee will have to perform a fire safety analysis and hazard assessment. It should include justification of the acceptability of the fire protection measures including the seismic robustness of fire protection equipment.	İTÜ Research Reactor (TR)
FUEL CYCLE FACILITIES		
ES-AFI-2	Need for consideration of the radiological risks in the FHA.	Juzbado FCF (ES)

FR-AFI-1	In the event of fire extinguished with water, the extinguishing water has to be retained and collected within the building concerned or its immediate vicinity. For two buildings out of the eight harbouring uranium-bearing materials, part of the extinguishing water is liable to infiltrate the soil. Thus, these two buildings must undergo improvements in order to retain and recover fire extinguishing effluents. These improvements are taken into account as part of the installation's ongoing periodic safety review.	Framatome Romans fuel fabrication facility (FR)
FR-AFI-2	Improve the implementation of spray water extinguishers regarding the Labour Code requirements. Incompatibilities with the process or particular water-reactive substances should be assessed in order to not degrade the safety of nuclear installations.	La Hague (FR)
NL-AFI-3	No obvious connection between the diverse fire analyses performed with different requirements, guidelines and scenarios depending on the fire analyses.	FCF Urenco (NL)
UK-AFI-1	Lack of systematic consideration of combined or consequential hazards assessment as part of the current safety case.	Springfields Fuels Ltd (UK)
SPENT FUEL STORAGE		
CH-AFI-1	A need for a revision of the fire protection concept into an 'overarching fire protection concept' and detailed building specific fire protection concepts.	Beznau and Gösgen NPP and Zwibez spent fuel storage (CH)
CH-AFI-3	Necessary to update and supplement the fire protection concepts and associated documentation in accordance with the national fire protection regulations.	Zwilag SFS (CH)
IT-AFI-2	There is a need to strengthen the fire detection provisions in the context of the planned fuel transfer into the new dry storage facility.	ITREC plant - SFS (IT)
IT-AFI-4	There is a need to reassess the fire protection measures to decide whether to install new provisions (e.g. fire dampers, smoke detectors, ventilation ducts, ...).	ESSOR Plant- SFS (IT)
LT-AFI-1	A need to install additional equipment that would allow remote monitoring of the situation in SNFSF-1 from INPP main control room.	SNFSF-1 (LT)
SK-AFI-2	There is a need to complete the replacement of external underground fire hydrants with external over-ground fire hydrants.	Interim spent fuel (SK)
SK-AFI-3	Additional work is needed to review the components and replace the cable connections of the fire detection and protection system (FDPS).	Interim spent fuel (SK)
SK-AFI-4	There is a need to re-evaluate the use of voice alarm in the civil structure.	Interim spent fuel (SK)
SK-AFI-5	There is a need to re-evaluate the possibility of controlling important fire equipment (HVAC equipment, ventilation of protected escape routes, fire doors, power shutdown) via the FDPS.	Interim spent fuel (SK)
SK-AFI-6	There is a need to elaborate procedures for the repair, the operability and the identification of fire protection system components.	Interim spent fuel (SK)
DECOMMISSIONING		
DK-AFI-1	Since there are no dampers installed in the ventilation system, the fire in the building can spread through the duct system.	Hot Cell facility - Risø site -

		Decommissioning (DK)
IT-AFI-3	There is a need to update the fire protection provisions in compliance with technical guide n. 31, in the context of the ongoing licensing process for decommissioning.	ESSOR RR, EUREX FCF - Decommissioning (IT)
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 loadings in the nuclear safety case.	Dounreay Prototype Fast Reactor Decommissioning (UK)
WASTE STORAGE		
DK-AFI-3	The lack of compartmentation (rooms not everywhere separated by doors and absence of floor to ceiling wall) requires complementary analysis to verify and implement, if necessary, compensatory measures to ensure that fire does not spread from between different activities.	Risø - Waste (DK)
DK-AFI-4	There is a need to implement a system to document the inventory of fire loads (e.g. computer system).	Risø -Waste (DK)
LT-AFI-2	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.	Waste (LT)