

European Nuclear Safety Regulators Group ENSREG

2nd Topical Peer Review – 'Fire Protection'

Country Review Report

Türkiye

January 2025

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1. Brief overview of the candidate installations

Installation category	Number of installations	Name of Candidate installations
Nuclear power plant	1	Akkuyu NPP (under construction)
Research reactor	1	İTÜ TRIGA
Fuel reprocessing facility		-
Fuel fabrication facility		-
Fuel enrichment facility		-
Dedicated spent fuel storage		-
Installations under decommissioning		-
On-site radioactive waste storage		-
Total	2	

The following installations were finally selected and included in the national assessment report (NAR).

2. Regulatory framework

The NAR states that "Fire Protection of Nuclear Facilities" regulation was issued in 2023 for nuclear facilities because there was a need to establish a new regulation dedicated only to nuclear facilities, as the Regulation on Fire Protection of Buildings was not applicable.

The NAR indicates that the Regulation Fire Protection of Nuclear Facilities specifies only general lines. Therefore, a series of national guidelines per licensing stage starting from commissioning are planned to be established, using the experience that will be gained from the field by inspections and feedback, harmonising them with international standards and adapting them to Turkish specific circumstances.

The NAR does not mention if the WENRA SRLs are transposed in the regulatory framework. In response to the question of the TPR Team¹, Türkiye's answer was *"Technical documents of international organizations (e.g Wenra IAEA) are taken into account as guidance and advice in our country."*

The NAR mentions that "The Regulation on Authorization of Nuclear Facilities defines the regulatory documents list [...] that the Authority considers necessary to be complied with. The regulatory document list may also include regulatory documents of other countries or international organizations that have been recommended by the Licensee or deemed appropriate by the Authority."

¹ 'The NAR in §1.2 presents the regulatory framework. If not yet clearly mentioned in the NAR, could you indicate whether the WENRA SRLs for NPPs, and RRs (if relevant for your country), which are used as reference for this topical peer review on 'fire protection' (as per the Technical specification) are binding or not in your country? If they are not binding, what is the status of the SRLs (non-binding, guidance, advisory..)?'

3. Findings and significant improvements of approaches on the installations from the national self-assessment

Nuclear power plants

Akkuyu NPP

The following strength related to fire protection was reported in the NAR for Akkuyu NPP:

• At the stage of the construction, the onsite fire brigade is considered the main strength for the facility with their highly trained staff.

No weaknesses related to fire protection were reported in the NAR for Akkuyu NPP.

The following **lesson learned** related to fire protection was reported in the NAR for **Akkuyu NPP**.

• The licensee JSC Akkuyu Nuclear is a subsidiary of Rosatom State Corporation. When implementing the fire protection concept, the experience of Rosenergoatom Concern was taken into account.

No improvements related to fire protection were reported in the NAR for Akkuyu NPP.

Research reactors

ITU TRIGA

The following strengths related to fire protection were reported in the NAR for ITU TRIGA:

- ITU TRIGA has protocol with Istanbul Fire Department.
- ITU TRIGA Management accepted invitation to participate in EU TPR II international mission to gain objective review and suggestions which are coming from international aspects and best practices other similar users for the fire safety status of the facility.
- ITU TRIGA Management has awareness and responsibility on the fire safety.

The following weaknesses related to fire protection were reported in the NAR for ITU TRIGA:

- Perception on there is no fire risk.
- ITU TRIGA Reactor and its SSC's are getting older and particularly on the upgrading, the system related to fire safety on the construction design and materials, for adapting new requirements on fire safety.
- ITU TRIGA operational organization deals with also other legal requirements;
- Lack of personnel and economic resources.

The following lesson learned related to fire protection was reported in the NAR for ITU TRIGA:

 There is no fire event or fire safety related international mission at the ITU TRIGA Reactor. However, before enforcing new regulations in line with the "Regulation on Fire Protection of Buildings" review and stakeholder communication process, lessons learned experience coming from Fire Department experience related to chemical facility and/or critical infrastructure fire cases are also included.

No improvements related to fire protection were reported in the NAR for ITU TRIGA.

4. Peer-review conclusions

4.1 Attributes of the NAR and the information provided

The candidate installation is the one which was the subject of the Board's review prior to the national self-assessment, plus one (ITU TRIGA) recommended by the Board. The recommendation of the Board (consideration of on-site waste storage) was not addressed in the NAR.

In general, the national report responds to the technical specifications, however specific descriptions provided therein are sometimes unclear or lacking in detail or context to allow to draw conclusions about their safety significance. Consequently, the identification of peer review findings based on the information in the NAR was not straightforward.

There are no comments on the structure of the NAR.

In general, the outcomes of the self-assessment were clearly mentioned.

In general, replies to the written questions allowed to clarify the identified issues.

Additional information and updates provided in reply to written questions, the site visit, and in the national presentation in the country review workshop were taken into account in the definition of the findings below in section 4.3.

4.2 Conclusions from the site visit

The site visit to the İTÜ Reactor took place on 12 June 2024.

During the site visit a number of topics, based on questions shared in advance with the counterpart, were discussed (e.g. new Regulation on Fire Protection of Nuclear Facilities-2023, Fire Safety Analysis, fire protection concept and implementation, strategy and organisation for fire emergencies, exchange of operating experience). Useful additional information and clarifications were provided.

During the plant walkdown the reactor building was visited, where it was possible also to view the recently installed fire suppression system, dry chemical powder and CO2 fire extinguishers, fixed fire hose cabinets and fire doors. The TPR II team viewed the distribution of the smoke detectors, and the recently installed FM-200 system in the control room.

The TPR II team noted:

- a good self-identification of the gaps and areas for future actions. In particular there are
 plans to develop a fire safety analysis and conduct thorough evaluations of the fire alarm,
 detection and suppression systems. The team indicated that pending the outcome of the
 analysis, existing measures could be deemed adequate.
- that the fire detection system, and recently installed fire suppression system, seem adequate in view of the defence in depth approach.
- a good coordination and involvement of the Istanbul Fire Department established through the 'Fire safety protocol between ITU and the Metropolitan Municipality'.
- the possibilities to improve sectorisation of the rooms in the reactor hall and to review the document storage at its present location.
- the possibilities of improvement in intervention strategy in the event of detection of a fire in the premises outside working-hours: Outside business hours, if the fire detection system is triggered in certain premises, the firefighters must wait for the on-call operator to arrive in order to enter the buildings. This is likely to delay response time for firefighting.

- the additional benefits that could be achieved by reinforcing safety culture (for example by reminding about housekeeping and avoiding unnecessary combustible fire loads).
- the possibilities to introduce some improvements, including a seismic risk analysis for robustness of fire protection equipment, the conduct of regular site exercises with fire services, the availability of adequate personnel and financial resources to deliver the action plan agreed between the operator and NDK.

In addition, the TPR team recognised that the adoption of a specific national regulation on "Fire Protection of Nuclear Facilities" in 2023 was a significant accomplishment for the country and which is currently being implemented.

The TPR II team appreciates the willingness and cooperation of Türkiye to host site visit to ITU Research Reactor.

4.3 Peer review findings

The self-assessment revealed some weaknesses in the fire protection of the nuclear installations. The finding in the table below was acknowledged as an area of improvement by the TPR Team:

Areas For Improvement mentioned in the NAR as weaknesses and acknowledged as such by the TPR Team						
Nuclear installation: İTÜ TRIGA Reactor						
AFI (1)	Need for review and upgrading of fire safety-related systems in order to adapt to the design requirements in the new regulation on fire safety in nuclear facilities.					

The TPR team recommends that Türkiye addresses this area for improvement in the National Action plan.

Areas of Improvement					
Nuclear installation: İTÜ TRIGA Reactor					
	Finding	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.			
AFI (2)	Justification	The fire protection measures should be reevaluated in accordance with the new regulations on fire safety regarding their effectiveness in meeting the fundamental safety functions. The probability of a partial release of the radioactive inventory of the research reactor should be realistically assessed and documented estimating possible consequences of the radiological releases to the public.			

During the country review workshop, the findings identified during the peer review phase have been discussed. Based on these discussions, the TPR team concluded on the following findings:

The TPR team recommends that Türkiye addresses these areas for improvement in the National Action plan.

Areas of Good performance					
Nuclear installation: Akkuyu NPP					
	Finding	The presence of a well-resourced on-site fire brigade contributes to responding to fires in a timely and robust manner.			
AGP (1)	Justification	The licensee has established a fire department responsible for ensuring the readiness of fire-fighting equipment and the means to extinguish fires at all stages of the lifecycle of Akkuyu NPP. It was stated that these onsite fire brigades perform periodical drills with external fire brigades and emergency team.			
Nuclear installation: İTÜ TRIGA Reactor					
	Finding	Formalised arrangements between the reactor facility and the city fire brigade contributes to an effective response in case of a fire.			
AGP (2)	Justification	The fire safety protocol between ITU and the Istanbul Fire Department enables a good coordination between the facility and the external firefighters. The involvement of the firefighters in inspections and trainings contributes to an effective intervention.			

Definition of the types of findings

According to the TPR II Terms of Reference, the country group workshop discussions should lead to conclude on the findings categorised as an 'area of good performance' or 'area for improvement'. These are defined therein as follows:

A National area of good performance which should be understood as an arrangement, practice, policy or programme related to fire protection that is recognized by the TPR Review Team as a significant accomplishment for the country and has been undertaken and implemented effectively in the country and is worthwhile to commend.

A National area for improvement which should be understood as an aspect of fire protection identified by the TPR Peer Review Team where improvement is expected, considering the arrangement, practice, policy or programme generally observed in other participating countries. It may also be self-identified by the country itself (i.e. self-assessment) where improvement is appropriate.