

European Nuclear Safety Regulators Group



Topical Peer Review II Country Review Workshop 'Fire Protection' 30 September – 3 October 2024

National Presentation of Türkiye Miraç Öztemiz





1. Akkuyu NPP

2. TRIGA MARK – II Istanbul

Candidate installations/regulation

TS 01.1 & 01.2



- Nuclear Installations are subject to «Regulation on Fire Safety in Nuclear Facilities» and non-nuclear buildings located in their sites are subject to conventional fire protection regulations.
- Additionally Independent Audit Companies will conduct surveillance (control and inspection) up to Operating License

Fire safety analysis

Fire safety analysis (FSA) (cf TS 02.1)

NPP

- The main fire safety analyses based on mostly deterministic approach with defense in depth but also probabilistic approach taken into account when fire safety analysis performed in AKKUYU NPP.
- The main objective of the deterministic analysis of the impact of fire on NPP safety is to assess the adequacy of decisions made in the design, including layout solutions, fire protection measures, systems and facilities required for safe shutdown.
- The following basic design solutions have been taken into account during the fire safety analysis:
 - Physical and functional separation of equipment.
 - Provision of protective measures for facilities:
 - Effective use of passive systems
 - Categorization of initiating events from 1 to 5

Fire detection (cf TS 03.2.1)

NPP

 The fire detection system consists of smoke detectors in the reactor hall, the control room, and other auxiliary laboratories, personnel rooms, etc. The system also includes alarm panels with audible and visual alarms.

- Strategy for the location of the detectors

The fire detection system is installed in all buildings, structures and installations in accordance with SP 5.13130.2009, with the exception of buildings of category B4 and D, buildings with wet processes, ventilation rooms (not serving buildings of categories A and B) and stairwells. In addition, a fire detection system must be installed in all listed buildings of categories A, B, B1-B4.

Fire suppression (cf TS 03.2.2)

 At Akkuyu NPP, pulverized or fine atomized water (water mist / fine spray system) is used as extinguishing agent for cable structures, power transformers, facilities and equipment containing flammable liquids.

Dry pipe automatic water fire extinguishing units are designed for the following systems:

- For fire extinguishing of cable rooms of normal working systems,
- Fire extinguishing of buildings with oil-filled equipment,
- Extinguishing transformers in the substation,
- These installations are used where there is no danger of flooding and there are no water drainage problems.

Passive fire protection

Compartmentation (cf TS 03.3.1)

NPP

The Akkuyu NPP project applies the principle of fire localization, which assumes that the fire resistance of surrounding structures located in the fire zone ensures the localization of the fire until the fire load is completely removed (without taking into account the effect of fire extinguishing agents on the fire).

Passive fire protection

Ventilation management (cf TS 03.3.2)

- In the reactor compartment design of the Akkuyu NPP, the mirror layout is implemented, which ensures symmetrical arrangement of the chambers of different channels of the safety system, separated from each other by a fire-resistant wall of not less than REI 150.
- There are no exposed connections through gaps, cable, ventilation, pipeline and other passages through this wall.
- Fire zoning eliminates the possibility of fire spreading from one fire zone to other fire zones not only through surrounding structures, but also through common ventilation, drainage systems and other communication links.

Conclusion

TS 01.3 and TS 04





Fire safety analysis

Fire safety analysis (FSA) (cf TS 02.2)



- The Safety Analysis Report and its appendix also includes primary fire safety analysis for reactor core and other SSCs. The fire hazard analysis will also be discussing the limitations of the methodologies used and how these limitations can be addressed.
- There is no direct experience related to deterministic or probabilistic fire safety analysis as required by the new regulations.
- However, there is limited experience in conducting safety analyses during the construction phase, operational, and ageing management process and occupational health and safety analysis regulation within the facility.

Fire detection (cf TS 03.2.1)

RR

- In accordance with regulations, there is a fire detection and alarm system with 46 sensors and 3 conventional fire alarm buttons. The system can rapidly detect smoke or fire in the ITU TRIGA.
- The service provider checks the operability of the fire detection and alarm system at least three times a year, with inspection, maintenance, and testing of the fire detection sensors and buttons. In addition, another fire detection and alarm system covers all rooms, labs, and other areas in the Energy Institute.

Fire suppression (cf TS 03.2.2)

RR

- In line with the "Regulation on Fire Protection of Buildings" and international fire safety standards; there are fixed, mobile, automated, and manual extinguishing systems are be installed at the reactor building with graded approach firefighting strategy for each area of the reactor area identified as important to safety such as proximity of control console, SSCs, access and exit routes, and other locations important to safety, etc.
 These systems also provide adequate coverage of areas of the research reactor relevant to safety.
- There is no loop for fire hydrant outside building and the internal standpipes of the ITU TRIGA relevant to safety. The service provider checks the operability at least three times a year, with inspection, maintenance, refilling and testing of the extinguishing systems.



Passive fire protection

Ventilation management (cf TS 03.3.2)

RR

 This requirement should be assessed with together service provider, contractor and Istanbul Fire Department.



Thank you for your interest...